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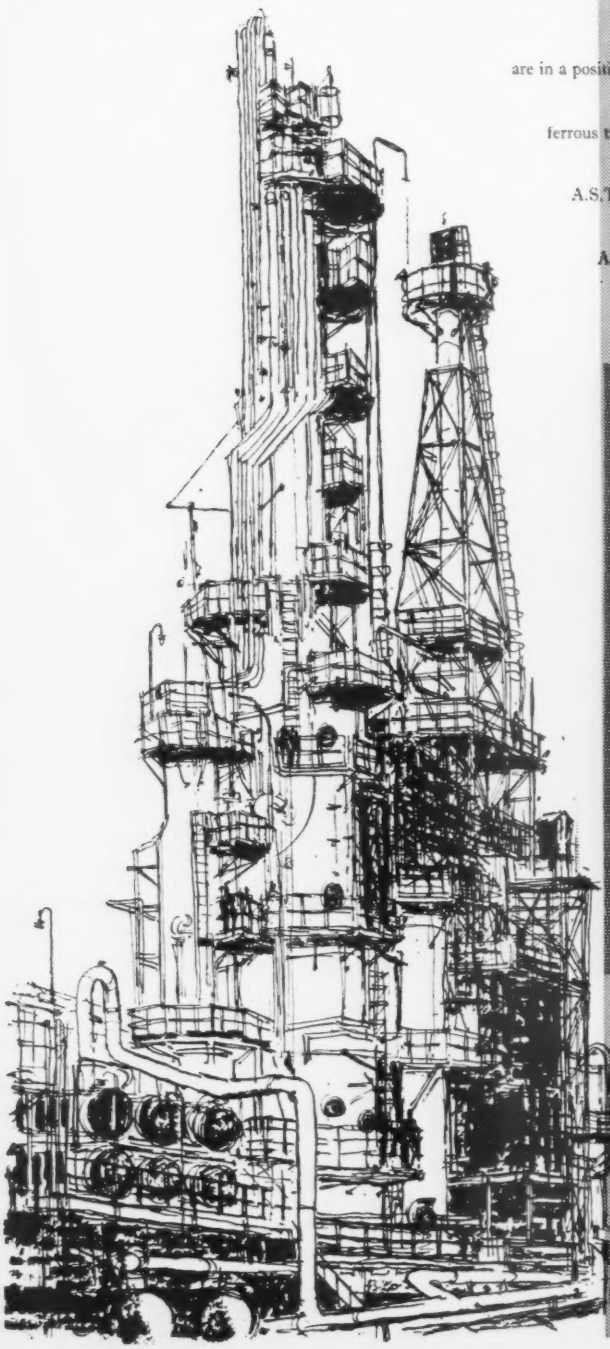

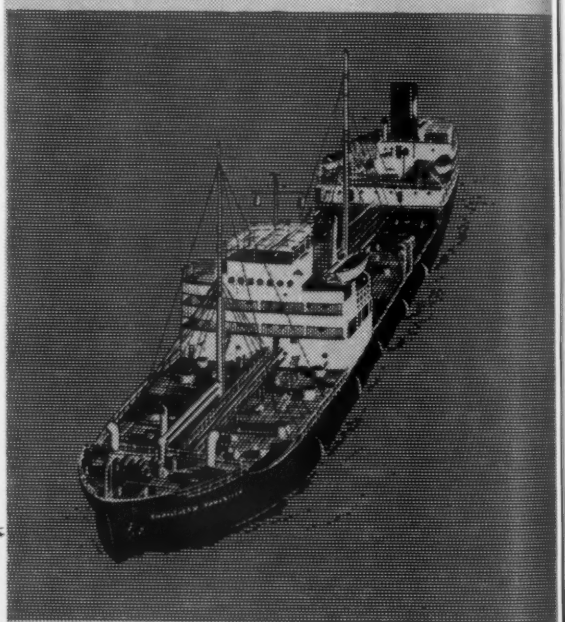

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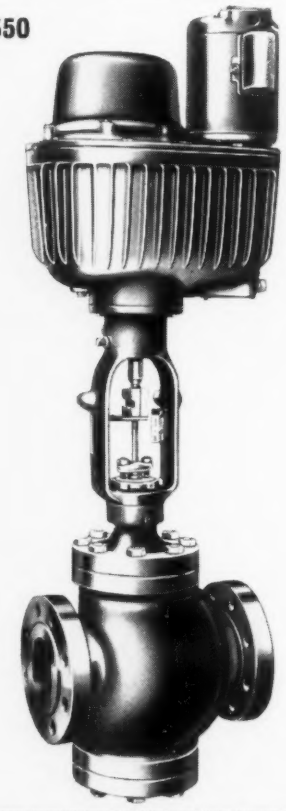

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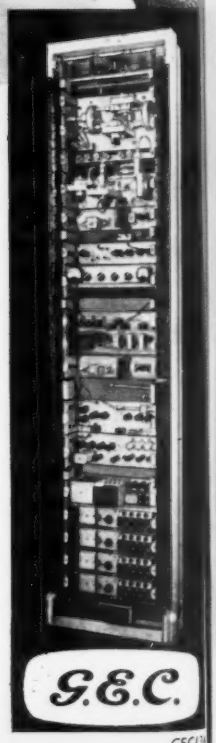

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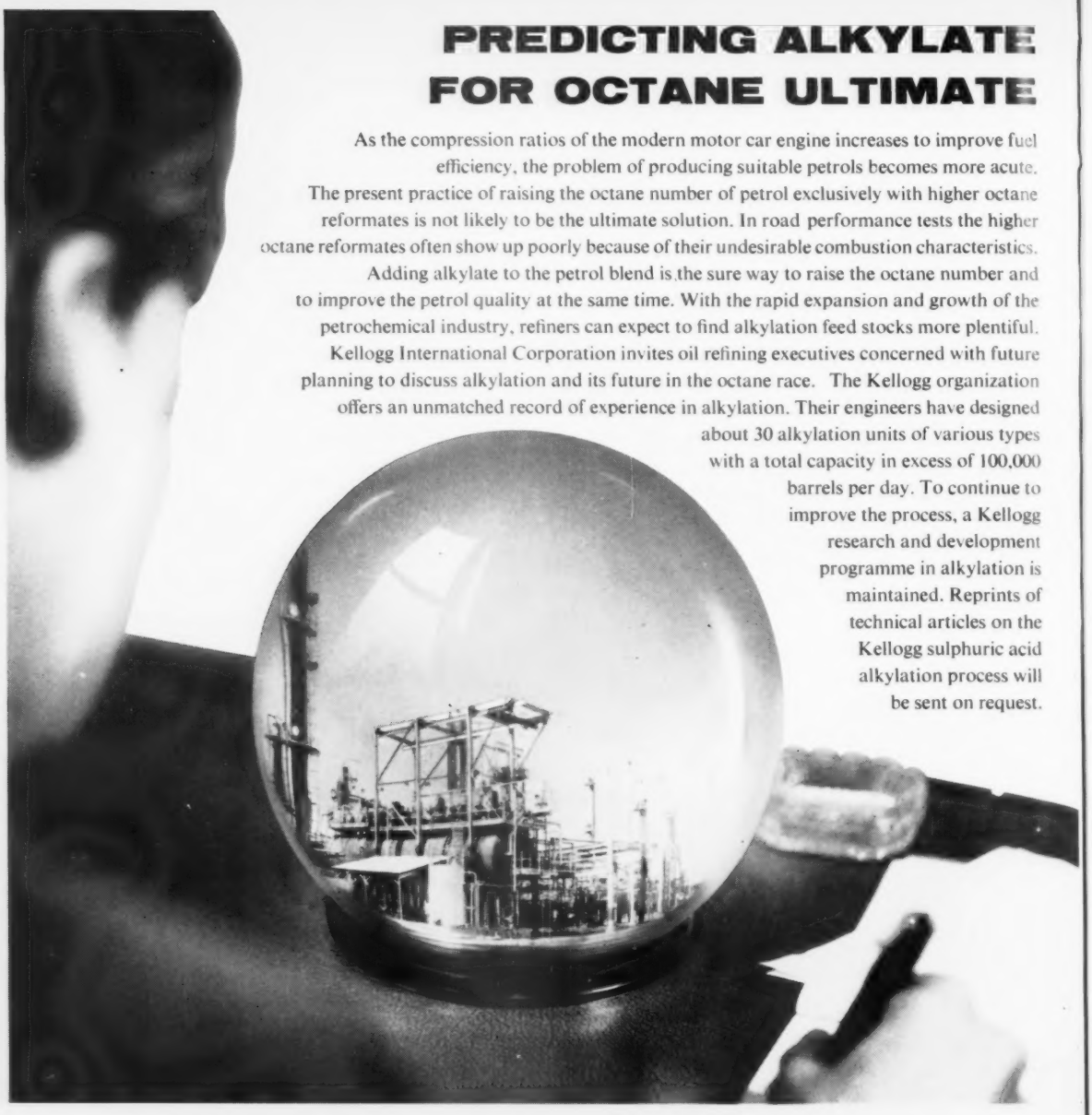

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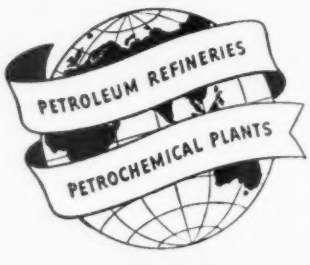

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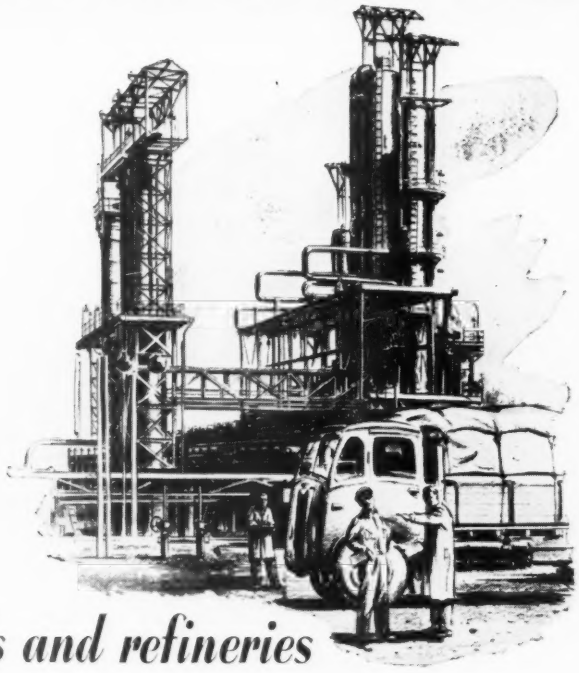

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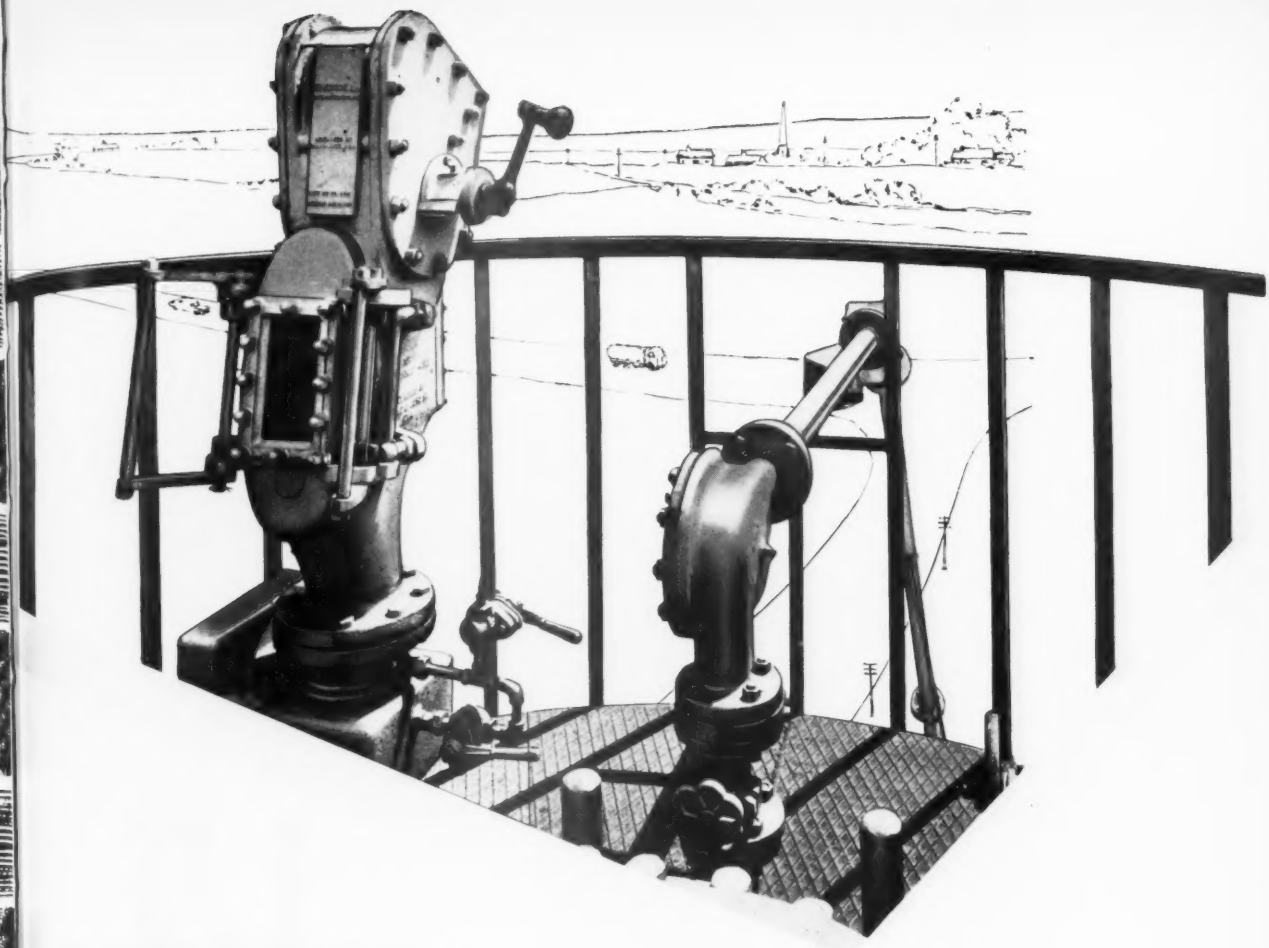

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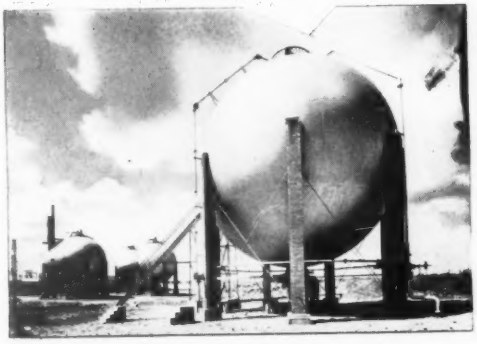

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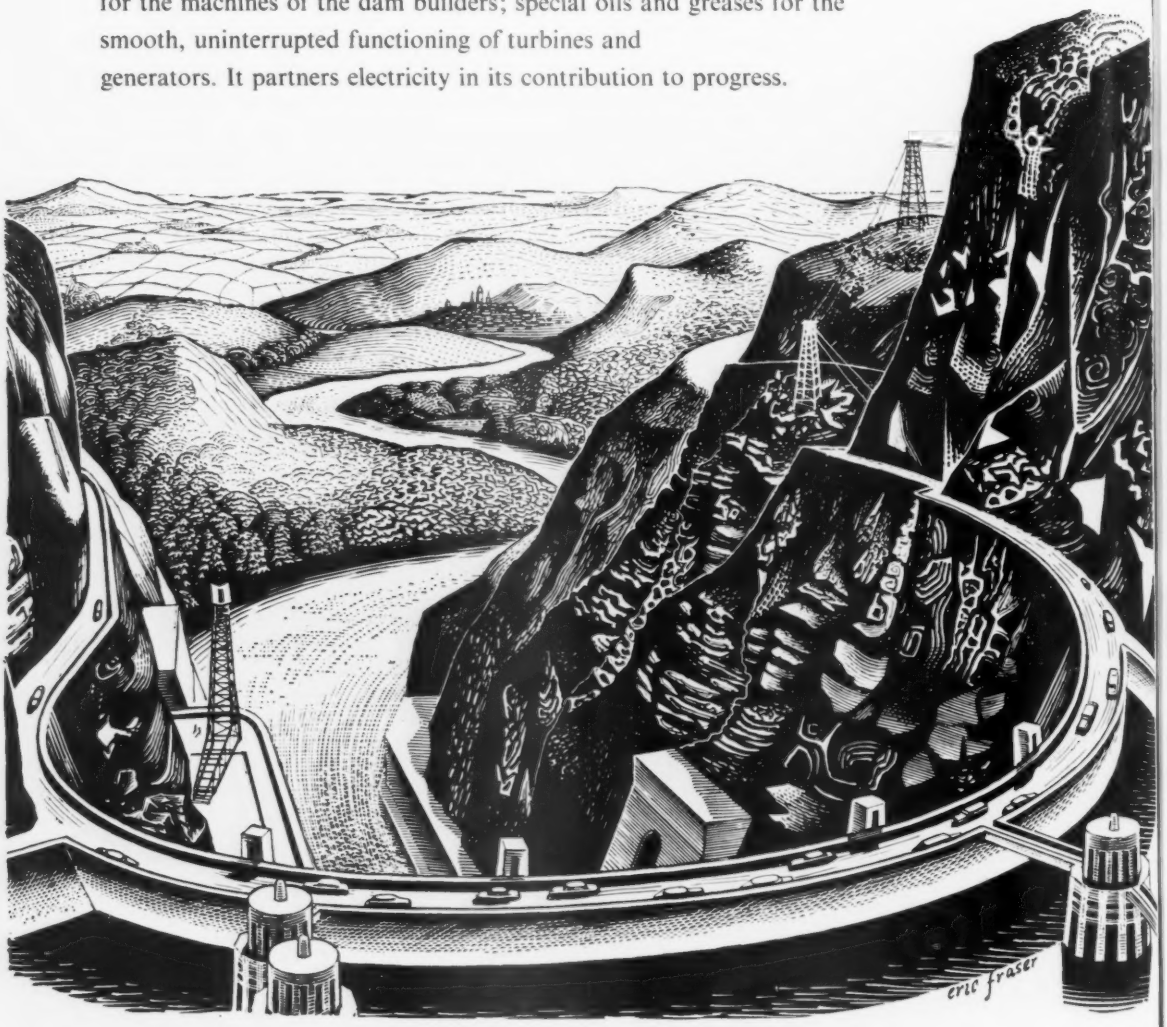

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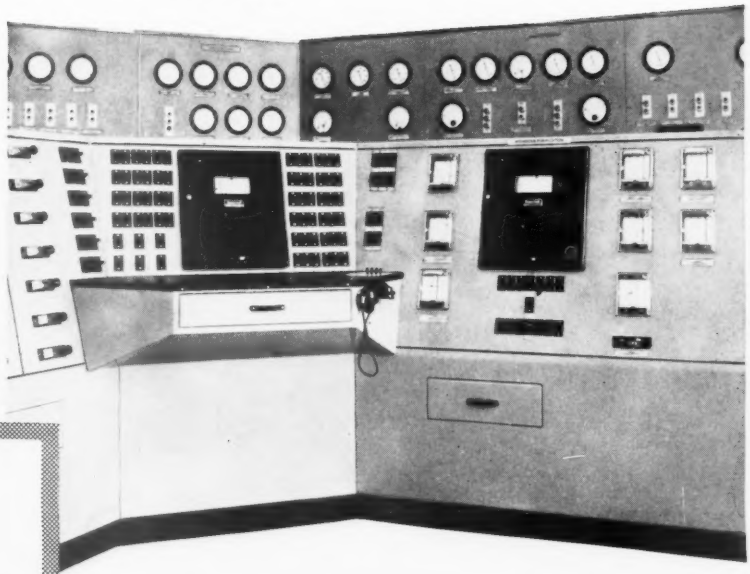

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Competitive Aspects of Oil Operations

Proceedings of the 1958 Summer Meeting

Fifth in the series of IP Summer Meetings, the 1958 event at Scarborough during the period 4 to 6 June was again a complete success, both technically and socially.

Opening the meeting, the President of the Institute, C. M. Vignoles, C.B.E., said that at the Summer Meeting in 1956 the subject was "Essential Factors in the Future Development of the Oil Industry". This year they were in a sense pursuing the same theme by examining one of the most important of these factors—the effect of competition.

The object of the seven papers to be presented was to demonstrate the essentially competitive nature of the industry, and also to discuss another feature of it which was closely related to the question of competition—the prevailing pattern throughout most of the free world oil industry of a comparatively small number of vertically integrated groups.

There could be no doubt, said Mr Vignoles, that this was a very topical theme for a meeting of the Institute in this year. As one leader of the world oil industry said recently, developments over the past year had "resulted in an intensification of competition . . . which is now as severe as it has ever been" in the history of the industry.

The twelve months since the last Summer Meeting had been eventful for the industry, and had produced trading conditions and problems quite different from those to which they had grown accustomed in the decade which went before. Until last year the industry was preoccupied with the task of meeting a demand for its products which was increasing at an unprecedented rate. It was generally assumed that after the interruption of the Suez emergency there would be an immediate return to that familiar pattern of progressive expansion.

In fact, however, almost as soon as the normal supply routes were restored, the first signs began to appear of a widespread slackening in the tempo of industrial activity, particularly in the United States of America, which was the prime mover in the economy of the entire free world. This led inevitably during the second half of 1957 to a levelling-off in the rate of growth in oil demand, to higher stocks, and weakened prices. In particular, tanker owners had been faced with an exceptionally violent fall on the freight markets from the unprecedented levels reached during the Suez emergency.

The venue—the Grand Hotel, Scarborough

Mr Vignoles said that there were indications that the tide was now just beginning to turn again. Certainly, so far as the United Kingdom market was concerned, trading figures for the first quarter of 1958 showed a gratifying upward trend. In any case, the oil industry was well experienced in viewing temporary contractions in demand in the

The delegates were welcomed by the President, C. M. Vignoles, C.B.E.

Mrs and Mr J. W. Boyd, with Saiyid Ihsan Rifat, Director-General of Oil Affairs, Government of Iraq

perspective of a long-term prospect of expansion which did not fundamentally alter. Recent difficulties had done nothing to lessen the basic confidence of the international industry that the world would need an increasing volume of oil products for very many years to come. It was a measure of that confidence that the period of uncertainty through which they were passing had not in any way materially affected plans for capital expenditure on new projects and facilities in all phases of the industry's operations.

Meanwhile, concluded the President, it was most appropriate for this Meeting to be devoted to an aspect of the industry which, while it was a constant feature of importance, was of special interest and significance in the present world oil situation.

Attendance

Total attendance of 174 was a new record for a Summer Meeting and the President was supported by the following members of Council: The Rt Hon. Lord Geddes, C.B.E. (*immediate past-president*); W. S. Ault, H. Hyams, J. S. Parker (*vice-presidents*); Dr E. B. Evans (*honorary editor*); D. L. Samuel (*honorary associate editor*); A. C. Hartley, C.B.E., M. E. Hubbard, E. C. Masterson, A. J. Ruthven-Murray, C.M.G., W. H. Thomas, G. H. Thornley, D. H. Tullis, and C. S. Windebank (members of Council). They were accompanied by Mrs E. B. Evans, Mrs A. C. Hartley, Mrs M. E. Hubbard, Mrs E. C. Masterson, Mrs J. S. Parker, Mrs A. J. Ruthven-Murray, Mrs D. L. Samuel, Mrs D. H. Tullis, and Mrs C. S. Windebank.

THE TECHNICAL SESSIONS

The seven papers contributed to the general theme of "Competitive Aspects of Oil Operations" were presented by their authors in three sessions. At the first session, on the Thursday morning, the chair was taken by the President. For the second session, on Friday morning, W. S. Ault was the chairman; and in the afternoon M. E. Hubbard presided.

Competition in the Modern Economy

In the first paper P. W. S. Andrews, of Nuffield College, Oxford, pointed out that economics had developed a considerable theoretical apparatus in its efforts to cope with the varied forms of competition which were met in the actual world. After some introductory remarks, he discussed competitive situations as economists had analysed them. The economist's ideal—perfect competition—was shown to be a concept inapplicable to much of modern industry, not because that was *un*competitive but because its fundamental characteristics were bound to be incompatible with assumptions which had to be valid for one to be able to use ideas of perfect competition. The alternative approach *via* concepts of monopolistic competition was shown to involve serious errors of reasoning in its attempted application to everyday

Regular supporters of the Summer Meetings. Members of the Kuwait Oil Company at Scarborough (left to right) *F. H. Colenutt, Mr and Mrs A. K. Murray, R. K. Blackwood, Mr and Mrs E. Jarman, Mrs F. H. Colenutt, Mrs E. C. Masterson, Mrs R. K. Blackwood, E. C. Masterson*

Mrs Samuel, R. Watling, Mrs and Mr N. A. White, and D. L. Samuel

competition. The conclusion was that competition in the real world must in fact be classified as "oligopolistic" and it was pointed out that economists had not been able to reach settled conclusions about the working of such competitive situations.

Such ideas as had been developed about competitive oligopolies were explored against a background of actual competitive situations. Broadly, economics was right when it said that such situations were potentially very unstable; but attention was called to business procedures which alleviated this but which had not yet been sufficiently analysed by economists, or concerning which they had not been able to reach agreed conclusions.

Mrs and Dr J. Birks and J. R. Lodwick

The last section of the paper dealt directly with this latter aspect of the subject. It called attention to the way in which modern large business was generally committed to competitive attitudes by the facts of its managerial organization. The apparent stability of industrial prices was compatible with fundamental underlying competition, and industrial pricing procedures were explained on this basis. The business situation, however, was not fossilized and attention was directed to the possibilities for instability. Against this background the author tried to face the prevalence of price-fixing arrangements which apparently went completely against competition in any sense, however understandable it might be that businesses should feel that they were driven into them. It was suggested that the obvious view of such "monopolies" was a superficial one and that they would in fact survive only insofar as they allowed room for the working of what all should agree were competitive factors.

Finally, there was a brief discussion of the competitiveness of the distributive system.

Oil Industry Structure

The second paper, by O. F. Thompson, O.B.E., and A. F. Peters of The Shell Petroleum Company Ltd, was presented by Mr Peters. He showed that the world-wide oil industry was made up of many thousands of companies, their structure having a wide range of differences. Nevertheless, in each sector of the oil process (exploration and production, refining, transportation, distribution and marketing) and both inside and outside the United States, the fully integrated company tended to be the dominant form of business organization. This had come about as a natural result of the forces of competition.

He described the varying roles which the fully integrated and non-integrated companies played at each stage of the oil process and explained why vertical integration was so prevalent a feature of the oil industry. It was also demonstrated, with the aid of historical examples, how competition had promoted vertical integration and, in its turn, had been promoted by it.

The paper concluded by stressing the essential effect of the competitive factor. Vertical integration had sometimes been thought to work against competition but in the oil industry's experience the reverse had been the case. Against two important criteria of competitiveness—diversification of products and flexibility of supplies—it seemed that the forces of competition had been considerable and had largely been the outcome of the peculiarities of the industry's structure.

In the course of a century of time the industry had had a record of consistently improving service; its structure had evolved in the best manner to achieve this. These twin facts seemed to constitute a good augury for the increased responsibilities of the years ahead.

Competition in the Search for Oil

In his paper, J. McV. Luard, British Petroleum Company Ltd, first considered the subject from the Government policy aspect of State monopoly versus free enterprise. The record of the oil industry under State control in Argentina and Mexico was compared with the industry's expansion in Canada and Venezuela, where private capital and competition were encouraged by favourable legislation. Greatly increased production in countries favouring free enterprise had stimulated a movement away from a closed-door policy as evidenced

Mr and Mrs D. H. Tullis and Mrs J. Cummings

by new petroleum legislations in Libya, Turkey, and Persia. Security of title and the prospect of a fair return for risk capital were prerequisites of foreign oil operations. The 50/50 principle was still generally regarded by Governments and the oil industry as equitable to both parties.

The aspect of competition next considered was that to secure new oil reserves. In addition to inter-company rivalry this was strongly influenced by objectives of national defence. Whilst the percentage of the free world's reserves located in the U.S.A. was declining, U.S. companies' share of total world reserves and reserves outside the U.S.A. had increased, notably in the Middle East and Canada. A feature in this trend had been the broadening interest of U.S. independents in foreign exploration.

Competition stimulated new thinking on exploration methods; among the new techniques instanced were the use of air photography and the way the problems of offshore exploration were being met.

Competition in Research and Development

On this aspect of the theme, C. S. Windebank, Esso Research Ltd, directed attention to the association between investment and industrial research, defining industrial research in terms of the effort made by a concern to determine the nature of its future capital investment. He claimed that, in a competitive industry, research was an essential counterpart to investment, and in a non-competitive industry there was no index by which to gauge whether industrial research was wisely directed or efficiently conducted.

David Ovens, F. C. McIntyre, and Geoffrey Chandler

He then discussed the activities of industrial research which were influenced by competition, and emphasized the part played by the patent laws in stimulating technological progress. He concluded by examining what the community got in return for the effort it devoted to industrial research through competitive industry, and claimed that it got the technological progress it wanted—at optimum efficiency and with maximum speed.

J. H. M. Clark, F. Robertson, and Mr and Mrs André de la Porte

Mr and Mrs J. A. Beckett, Mr and Mrs M. E. Hubbard, and P. W. S. Andrews

Competition in Quality

On the question of competition in quality, S. F. Chisholm and G. A. Dickins, of Mobil Oil Company Ltd, pointed out that the part played by quality was rarely referred to in the literature of theoretical economics. They showed that the petroleum industry concerned itself with all aspects of quality. The definition of quality and how it was recognized were discussed.

Various examples of competitive activities were dealt with and were divided into six aspects. This discussion served to illustrate the more important factors existing in competitive activities.

Sections of the paper were devoted to the place of patents in competition in quality and of quality control within the petroleum industry.

The authors concluded that there was a vigorous and healthy competition within the petroleum industry.

Competition in Marketing

On the important subject of competition in marketing, A. L. King, general manager, Sales, Shell-Mex and B.P. Ltd, said that competition between oil companies was not only a matter of price, but also very much of the quality of the products and in the service which companies gave to their customers.

Referring to the development in recent years of the "solus" system of marketing petrol and oil, Mr King pointed out that this had certainly not lessened competition, but had changed its form. Nowadays companies competed for the custom of whole stations instead of individual pumps on stations. Of the 35,000 stations in the U.K., oil companies probably owned fewer than 5 per cent.

In the market for industrial lubricants over 400 oil companies operated, some selling as many as 1000 different grades of oil. New industrial processes made constant demands for new lubricants, and there was considerable competition for certain business. An example was atomic power stations, which required the development of special lubricants able to operate under radiation conditions.

Mr and Mrs J. S. Parker, Mrs Sherlock, A. J. Ruthven-Murray, Colonel Oliver Sherlock, and E. C. Masterson

Mrs Dickins, R. S. Hopper, G. A. Dickins, and G. L. Kennaby

Shortage of domestic coal had caused a spectacular growth in the use of kerosine heaters, and this had had to be accompanied by improvements in the quality of kerosine to meet the greater efficiency of the appliances. Oil companies had competed strongly to ensure good service and convenience of supplies through a great variety of outlets. In this field there was further competition from electricity and gas.

For some uses of oil competition was, however, more apparent than real. The industry, said Mr King, had always seen the use of fuel oils as complementary to coal, and not as its competitor. By using fuel oil where it had clear technical and economic advantages it made its maximum contribution to the country's total energy requirements.

Crude Oil Prices

The final paper was presented by David Ovens, of *The Economist*, and dealt with the next five years in crude oil prices. He pointed out that restrictions recently imposed on imports of crude oil into the United States had brought an important new factor into the determination of prices.

The prices of U.S. crudes, protected against competition from cheaper imports, would be determined mainly by costs of production, and by the extent of the price-differential between domestic and foreign oil which American consumers would tolerate on security grounds.

Outside the U.S., crude prices would be still determined by competition between the Middle East and Venezuela, modified in particular markets by competition from Russian oil. But they would no longer rest on a floor set by prices realized on sales to the U.S.A. It seemed likely that profit margins on crude oil production would fall during the next five years, both in Venezuela and the Middle East. The extent of the fall would be aggravated by the increase in independent output seeking a market, and limited by the success of the major companies in persuading their host governments of the need to restrict output or at least to postpone some development plans.

The major companies might, by postponing some development plans, be able to prevent some fall in prices from present levels. There was unlikely to be much change in the next five years in the share of the market outside the United States at present held by Middle East and Venezuelan crudes.

Mr Ovens concluded by questioning whether the accepted principle of a single posted fob price, applicable to shipments to all destinations, was the most appropriate for a period during which competition between producers was likely to be as intense as at any time during the last twenty-five years.

The President (right) *takes it easy with* (left to right) *R. K. Blackwood, A. C. Hartley, Lord Geddes, and Mrs Blackwood*

DISCUSSION

At no time during the technical sessions was there any lack of interest, and all sessions were very well attended. Consequently discussion was sustained without any prompting from

M. S. Mainland and G. Heseldin

the chair. In fact, it was standard practice that the chairman had to close the discussion because the time allocated to a particular paper had come to an end.

VOTE OF THANKS

The chair for the closing session was taken by the President, C. M. Vignoles, C.B.E., who said:

At the opening of our meeting yesterday morning, I emphasized that the theme chosen for the programme of papers this year was of particular topical significance in the context of current problems which face the industry.

Now that we have reached the end of these technical sessions I am sure you will agree with me that the programme as a whole has been excellently designed to fulfil that sense of topicality, without in any way departing from the principle that these Summer Meetings give us the opportunity to discuss matters of general and continuing interest to the industry.

I know that you will wish me to express our thanks and congratulations to D. L. Samuel and the other members of the Papers Sub-Committee, including Dr E. B. Evans, the chairman of the Publications Committee, for the very imaginative and comprehensive programme which they have provided. They will themselves join me in acknowledging the invaluable assistance given by the Economics and Operations Group, and particularly by its chairman M. E. Hubbard and by G. Chandler. I would like to thank Mr Hubbard and W. S. Ault for having taken the chair at two of our sessions.

The high standard of the programme has been entirely matched by that of the seven individual papers themselves, which have without exception been most stimulating as well as authoritative, and have provided quite exceptional material for thought and discussion. The Institute is most grateful to their authors for all the skill and time which have been devoted to their preparation.

As in other years, we are especially indebted also to George Sell, the editor whose arrangements for the presentation of the technical sessions have once again ensured that we were able to derive the maximum benefit and satisfaction from the papers we have heard.

I cannot close this meeting without a special reference to the setting in which we have met this year and to the excellence of the organization which has made our stay here in Scarborough so very enjoyable and comfortable. We are all well aware that the provision of facilities for a meeting of this scope involves an immense amount of work, and we are most grateful to the general secretary, D. A. Hough, both for this and for the very pleasant social functions he has arranged, which add so much to this occasion. I should like also on your behalf to say a special word of thanks to J. S. Parker who kindly made it possible for us to have the film show last night.

Through the unsparing efforts of those people I have named, and of many others besides, this has been a most happy, valuable, and successful meeting. I hope that you have all enjoyed it, as I have, and it only remains for me to thank you for your attendance and to say how much I look forward to our next Summer Meeting.

SOCIAL EVENTS

The social side of the Summer Meeting, the occasion when members and their wives meet to make new and to renew old acquaintances, was well up to the standard of previous meetings.

The first of these events was on the Wednesday evening when, during a very pleasant cocktail party the President took the opportunity of greeting those present. He particularly welcomed those who had come from overseas and especially mentioned Saiyid Ihsan Rifat, Director-General of Oil Affairs in the Government of Iraq. He also expressed much pleasure at the presence of so many ladies, who he hoped would enjoy the entertainment provided for them.

On Thursday afternoon a large party proceeded by coach to York and were pleased that, as they got further inland, the mist which enshrouded Scarborough gave way to sunshine. At York they were conducted round the 1300-year-old Minster by members of the cathedral clergy. The ancient stained glass, which rivals anything in the world, was particularly admired, and the whole history of this glorious building was most attractively explained by the guides. This added considerably to the pleasure of the tour.

After dinner on Thursday the film *The Importance of Being Ernest* was shown by courtesy of J. S. Parker, who had provided the projection equipment and arranged for the film to be available.

From the ladies' point of view Friday afternoon gave a choice between Davis Cup tennis or a drive across the moors to Whitby Abbey. Unfortunately, a heavy sea mist spoiled most of the pleasure of what is normally an attractive drive.

The same sea mist also made golf difficult on the two Scarborough courses. However, golfers never give up and it is reported that some good games were played on the Ganton Course, about nine miles inland.

The finale—the dinner-dance on the Friday evening—was a most enjoyable event. Those who were able to remain for this event voted it a very happy ending to an excellent Summer Meeting.

THE PROCEEDINGS

As on previous occasions, the papers and a full report of the discussions will be published in book form as soon as possible. Details will be given in the *IP Review* as soon as the book is ready.

REFERENCE FUELS FOR IGNITION QUALITY TESTS

IP Method 41 (Ignition Quality of Diesel Fuels) specifies the use of two secondary reference fuels designated HIQ and LIQ of 70·5 and 18·0 cetane number respectively. Stocks of these fuels have now been exhausted and operators of diesel-fuel test engines are recommended to make use in future of secondary reference fuels T.14 and U.7, which are currently obtainable from Shell Oil Co. Incorporated, Wood River, Illinois, U.S.A. They can be purchased in barrel lots in the U.K. through Esso Petroleum Company Ltd, Wholesale Dept., 15–17 Suffolk Street, London, S.W.1, and calibration tables are available from the suppliers.

These fuels have been calibrated under the supervision of the ASTM and since they are already in use by numerous laboratories in other parts of the world, the Panel feels there is no longer any justification for calibrating special reference fuels in Great Britain. The official cetane number of T.14 is 71·0 and U.7 has a value of 24·0. Tests conducted by the Panel during the past year have shown that, for all practical purposes, these reference fuels are interchangeable with HIQ and LIQ as formerly used.

Notes of the Month

Iraq's Oil Exports to Mediterranean Restored

On 25 June the export of crude oil from Iraq to the Mediterranean was restored to the level at which it was running prior to the destruction of the three pumping stations in Syria in November 1956, states the Iraq Petroleum Company.

Resumption of this rate of 25 million tons a year has been made possible by the provision of additional pumping capacity in three stations in Iraq and at T.3 in Syria, and by the construction of various loops in the pipeline system across the Syrian Desert.

Of this 25 million tons a year, 17·5 million tons go by the 30-inch pipeline to the Syrian terminal at Banias, and 7·5 million tons to the Lebanese terminal of Tripoli, fed by two lines, one 12-inch, originally laid down in 1934, and the other the 16-inch, laid down in 1949.

The next stage in the expansion of throughput will be achieved by further loops now under construction which will raise the rate of flow to 28 million tons a year early in 1959.

The Britain in Europe Committee

A new organization, with offices in London, has been formed to stimulate interest in Britain's participation in the European Free Trade Area. The main function of the organization, which is to be known as "The Britain in Europe Committee", is to undertake or sponsor original research on European economic integration. It will also provide specialized information and documentation and will initiate or support courses, lectures, and meetings.

Chairman is Sir David Kelly, G.C.M.G., M.C., chairman of the British Council and president of the British Atlantic Committee. Lawrence Robson, F.C.A., F.W.C.A., chairman of Associated British Engineering Ltd, is chairman of the Executive Committee, and the vice-chairman is Ernest Jones, president, National Union of Mineworkers.

The committee consists of more than fifty members amongst whom are H. H. Bates, chairman, Benzole Producers Ltd; Lord Douglas of Kirtleside, chairman of British European Airways; and D. Maxwell Buist, export director, British Electrical and Allied Manufacturers Association.

The hon. secretary of the new organization is E. G. Thompson, technical sales manager, Baird & Tatlock Ltd, and the offices are at 61 Catherine Place, Palace Street, London, S.W.1 (Telephone: Victoria 4165–6).

87 Miles of Drilling in the Assam Valley

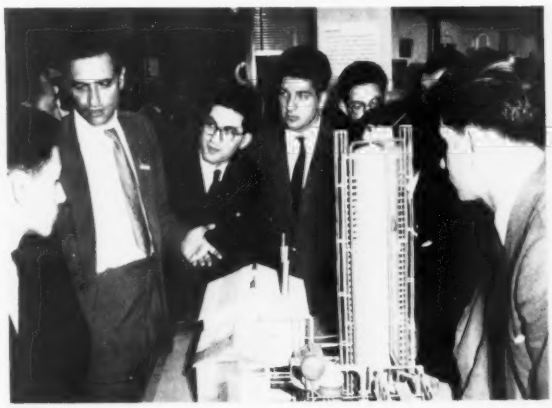
The total depth of 42 wells drilled by the Assam Oil Co. Ltd at Nahorkatiya and Moran, Upper Assam, during the past five years is 459,364 ft or nearly 87 miles.

The first well at Nahorkatiya was completed at 11,715 ft in June 1953 and the latest, No. 33, at 10,280 ft in June this year. In Moran well No. 9 reached 11,789 ft in June 1958.

Exploration at Nahorkatiya dates from 1925 but drilling in the area did not begin until May 1952. More than 200 wells were drilled before the discovery of oil at Nahorkatiya in 1953. Of the 33 wells drilled in the area five produced no oil and two are mainly gas producers. Average depth is about 10,614 ft but the deepest has reached 13,060 ft.

At Moran the deepest well, No. 1, is 13,739 ft.

Iranian Students at Olympia



Fifteen Iranian engineering students, studying in Britain, were guests of Constructors John Brown Ltd and Fibreglass Ltd at a luncheon in London on 19 June. Afterwards the students paid a visit to the Chemical and Petroleum Engineering Exhibition at Olympia. They are seen above with Dr Mark Guter, chief chemical engineer of Constructors John Brown, inspecting one of the models on the Company's stand

Shell-Mex and B.P. at Gatwick

At the new Gatwick Airport Shell-Mex and B.P. have built an airport depot capable of handling all types of aviation gasoline and turbine fuels. It is the second depot of its kind in Britain; the other is at Ringway Airport, Manchester.

There are ten 30 ft · 9 ft underground tanks, each fitted with a floating suction hose for quality control.

Four high-speed centrifugal pumps load refuelling vehicles. Products are filtered into tanks from delivery vehicles and then through micronic filters prior to delivery into refuelling vehicles from tanks.

A modern office with under-floor heating has also been built.

Three Cornwall refuelling vehicles with trailers with a total capacity of 17,400 gal are operating on the airport, with a 500-gallon Hern lubricating oil vehicle.

The illustration shows a Duchess class Heron of Jersey Airlines being refuelled.

Australian Oil Search Progress

The following information on oil prospecting in Australia has been extracted from Oil Search Newsletters Nos 4 and 5, issued in June by the Office of the High Commissioner for Australia in the United Kingdom.

The Government's Petroleum Search Subsidy Act, which provides for £300,000 to be available for subsidy in 1957–58 and £500,000 for each of the three succeeding years, came into operation on 12 December 1957 and 16 companies had lodged applications for assistance.

New South Wales

At the end of April the depths of wells drilled by the Australian Oil and Gas Corporation Ltd were: Dural No. 2, 5240 ft in shale; Camden No. 3, 1710 ft in sandstone; and Camden No. 4, 1825 ft in sandstone with shows of gas.

Victoria

Woodside (Lakes Entrance) Oil Co. N.L., after reporting a show of oil at 1290 ft in the Oilco No. 1 well at Lakes Entrance, reached basement at 1366 ft, and the well was abandoned on 12 October 1957 because of insufficient flow. The Company's Hedley No. 1 bore was drilled to 4013 ft without finding oil or gas.

Dome Oil and Mineral Syndicate N.L. spudded in the first of a series of shallow test holes on the Frome-Lakes Pty Ltd licence in East Gippsland. This well reached final depth of 564 ft on 21 December 1957.

Queensland

Longreach Oil Ltd's Balmoral No. 5 was reported at 900 ft at the end of April.

Associated Australian Oilfields N.L. and Frome-Broken Hill Pty Ltd spudded in on 19 October 1957 the Wyaaba bore. Basement was struck at 2758 ft but the well was drilled to 2822 ft.

South Australia

South Australian Department of Mines' bore at Minlaton was last reported to be at 2870 ft and the Department's other bore at Salisbury to be at 900 ft.

The stratigraphic test (Woomera No. 1) carried out by the Clarence River Basin Oil Exploration Co. N.L., near Pimba, was drilling ahead at 1174 ft in blue shale.

Western Australia

Western Australian Petroleum Pty Ltd completed the Learmonth No. 1 stratigraphic test at 7636 ft.

Samphire Marsh No. 1 stratigraphic test, which was spudded in on 18 February, drilled to 6669 ft with no indications of oil or gas.

The Bureau of Mineral Resources' Wallal No. 4 stratigraphic hole was drilled to 1410 ft when mechanical failure suspended operations. During repairs the well started to flow water at approximately 1 million gal per day. The drilling rig was moved to a new location and drilling was last reported at 1593 ft.

Papua

Komewu No. 1 well, being drilled by Australasian Petroleum Co. Pty Ltd, and Island Exploration Co. Pty Ltd, was abandoned on 8 October 1957 at 6393 ft. Komewu No. 2 was abandoned at 9977 ft.

At the end of April Barikewa No. 1 was drilling at 11,815 ft, Kuru No. 3 was spudded in on 30 April, and Puri No. 1 was drilling at 6917 ft. Kaufana No. 1 was completed at 3380 ft by the Papuan Apinaipi Petroleum Co. Ltd.

Increased U.K. Petrol and Fuel Oil Prices

From 16 July, as a result of the hardening of world prices, the price of premier and standard grades of petrol in the U.K. has been increased by $\frac{1}{2}d$ a gallon. The new prices are as follows:—

	Inner zone	*Outer zone*	*General zone*
	s. d.	*s. d.*	*s. d.*
Premier	4 $8\frac{1}{2}$	4 9	4 $9\frac{1}{2}$
Standard	4 $2\frac{1}{2}$	4 3	4 $3\frac{1}{2}$

From 17 July the wholesale price of white spirit has been raised by $\frac{1}{2}d$ per gallon, and there has also been an increase of $\frac{1}{4}d$ a gallon in the price of vaporizing oil, derv fuel, all grades of gas oil, and light fuel oil.

High Seas Exploration Well in North Borneo Abandoned

The Shell Company of North Borneo Ltd has abandoned its first high-seas exploration well at Hankin Shoal, 30 miles north of Labuan. The well had been drilled to nearly 9000 ft but no indication of oil was found.

The well was part of the general marine exploratory drilling programme planned jointly by Shell North Borneo Ltd with its associates, Brunei Shell Petroleum Co. Ltd and Sarawak Shell Oilfields Ltd in the search for new oil-bearing structures along the continental shelf off British Borneo. To date four wells have been drilled but the results have been negative.

New Waterspeed Record for 800-kg Boats

On 23 June Norman Buckley established a new world water-speed record for motor-boats in the 800-kg class by covering 89·08 miles in one hour over a five-mile triangular course. In his Jaguar-engined speedboat, *Miss Windermere III*, Mr Buckley beat the old record of 81·26 mph, held by Herr von Mayenberg, by maintaining a constant speed in the straight of about 105 mph.

Mr Buckley now holds four world records. The other three are: the three-hour record at 51 mph, established in 1951; the unlimited class one-hour record at 79·66 mph, established in 1956; and the straight mile record of 113·5 mph in the 1200-kg class, set up in July 1957. Mobil products were used in all these cases.

Mobile Display Unit to Show BP Activities

In order to show some of the many activities of the BP Group in the form of pictures and films a new four-wheeled trailer has recently been completed in Britain. The first assignment of the new trailer was a tour of Belgium.

Plastics have been used extensively for the bodywork of the trailer which is painted in the standard green and yellow colours of the BP Group. Flap-type doors on each side can be raised by one man to reveal the interior display and films can be projected on to a translucent screen at the rear of the trailer.

Major Project for Supertankers on the Mersey to Feed Stanlow Refinery

The Mersey Docks and Harbour Board and Shell Refining Company Ltd are to develop a major project to handle supertankers at Tranmere on the Cheshire side of the River Mersey, nine miles north-west of Stanlow refinery.

The rapid growth in the size of these vessels during recent years has posed problems both for oil companies and port authorities, so that the Mersey Docks and Harbour Board has sought and obtained Parliamentary powers to provide facilities for accommodating such tankers in their area.

The Tranmere scheme incorporates the construction of two large floating stages, adjacent to Cammell Laird's shipbuilding yards. Each stage will accommodate a fully loaded supertanker of up to 65,000 dw tons, and even larger vessels on a restricted draught.

New Type Mooring Dolphin

Each stage will be 362 ft long and 60 ft wide, with a timber deck supported on steelwork. To permit safe mooring of supertankers of 700 ft or more overall length, special floating mooring dolphins will be provided ahead and astern of each stage. These dolphins, which incorporate new and ingenious features (for which patent applications are pending), were designed by engineers of the Shell Refining Co. Their design in its final form is the result of collaboration with the Mersey Docks and Harbour Board and will result in a considerable saving in construction costs as compared with one long continuous stage. The whole scheme allows for the large tidal rise and fall (over 30 ft) of the Mersey.

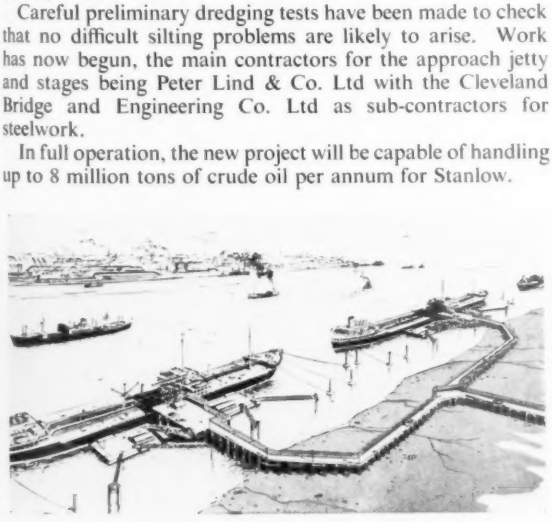
Access to the two-berth oil stage will be by a forked approach jetty carrying roadway, footway, and pipelines ranging from 16 to 30 inches in diameter, in addition to light, power, and telephone cables.

The oil stage will remain the property of the Mersey Docks and Harbour Board, but all the oil lines will be owned by Shell. The oil will be pumped by ship pumps through pipelines into balance tanks on the reclaimed land nearby, and then by shore pumps to Stanlow. Simultaneous discharge of two supertankers of up to 65,000 dw tons will be possible, enabling about 150,000 tons of oil to be discharged daily.

Silting Tests

Careful preliminary dredging tests have been made to check that no difficult silting problems are likely to arise. Work has now begun, the main contractors for the approach jetty and stages being Peter Lind & Co. Ltd with the Cleveland Bridge and Engineering Co. Ltd as sub-contractors for steelwork.

In full operation, the new project will be capable of handling up to 8 million tons of crude oil per annum for Stanlow.



New London Skyscraper for Wakefield Group

The Borough of Marylebone is to have a new skyscraper, the tower of which will be 170 ft high. Situated between Baker Street and Edgware Road and facing Marylebone Town Hall, the building, which is to be known as Castrol House, will be the headquarters of the Wakefield Group of Companies.

This skyscraper development is being carried out by the Hammerson Group of companies of Park Lane. The island site will be covered only by ground and first floors, part of which will be surmounted by the 16-storey tower from the top floor of which a spiral staircase will lead to an observation turret. Approximately 150,000 sq ft of floor space will be available and an underground car park will house 100 vehicles. A battery of electronically controlled passenger lifts, travelling at 500 ft/min, will serve all floors and space heating will be by radiant ceiling panels.

It is hoped that the building will be completed by the end of 1959 and it is anticipated that its opening will coincide with three Wakefield jubilees—the 100th anniversary of Lord Wakefield's birth, the 60th anniversary of the formation of C. C. Wakefield & Co. Ltd, and the 50th anniversary of the introduction of Castrol.

Contractors for the building are Sir Robert McAlpine & Sons Ltd and the architects are Gollins, Melvin, Ward, and Partners in association with Sir Hugh Casson and Neville Conder.

Two 35,000-ton BP Tankers Launched

In the last ten days of June two 35,000 dw ton tankers were launched for service with the British Petroleum Co. The first of six ships ordered in 1955 and being built in Italy for BP Tanker Co. was launched on 21 June by Lady Clarke, wife of the British Ambassador to Italy. The new vessel, which is named *British Star*, is being constructed by Cantieri Riuniti Dell'Adriatico at Trieste. She has an overall length of 683 ft and a breadth of 86 ft. Her single-screw, driven by steam turbines, will give her a loaded service speed of 15½ knots.

Nine days later, on 30 June, *Nordic Hawk* was launched from the yard of Fairfield Shipbuilding and Engineering Co. Ltd, Glasgow, by H.R.H. Princess Margaretha of Denmark. *Nordic Hawk* will be registered in Denmark and will be managed by the East Asiatic Co. of Denmark, on behalf of Nordic Tankships I/S. One of BP's Danish associates, A/S Tankskibsrederiet (Tank Shipping Co. Ltd), recently entered into a tanker-owning partnership with the East Asiatic Co. to form Nordic Tankships I/S.

New Offshore Platform Launching Equipment Introduced

A new American controlled-platform launching barge is claimed to reduce considerably the cost of installing and recovering offshore drilling platforms. Details of the new unit were given in a recent announcement issued jointly by Coastal Marine Drilling and Construction Corporation, Houston, Texas, the operator of the unit; L. B. Christenson, John R. Graham, and I. W. Alcorn, the inventors; and Todd Shipyards Corporation, 1 Broadway, New York, the builders.

Present platform installation methods, which require a derrick barge and at least four auxiliary craft, often take from 7 to 14 days and may cost up to $100,000. The new method normally completes the installation within 4 or 5 days, and actual placing of the platform on the sea floor occupies only 2 hours; the remaining time is spent in driving and welding the steel piles which secure the platform to the sea-bed. Piles are placed in each leg of the platform at the time of its construction and this facilitates site installation. Overall installation costs are said to be reduced by at least one third.

The new unit consists of two 130-ft-long barges hinged together. One barge is 56 ft wide and the other is 32 ft wide, but both have a hull depth of 8 ft 4 in. Their combined net buoyant force is 1800 tons.

After transporting the platform from shore to drilling site the barges are carefully positioned and the smaller is gradually submerged through a 90° arc by the combined action of ballasting and four double-acting hydraulic rams, each of which can exert a thrust of 300 tons and a pull of 250 tons. The ballast tanks are filled and emptied by two 1000 gpm centrifugal pumps.

During transport the platform rests on its side on both barges, but at launching it is fastened only to the submerging barge and therefore it moves downward into the water from a horizontal to a vertical position. Once upright and resting on the bottom, the platform is automatically released from the barge, the barge is gradually returned to its original horizontal position on the surface, and the platform is secured to the bottom with its integral steel piles. The entire procedure is reversed in recovering the platform.

Coastal Marine Drilling and Construction Corporation has been developing the unit for the past 1½ years. Scale models of the barge and platform were tested at simulated water depths from 60 to 120 ft. Two professors from the Texas A & M College concluded that 5-ft waves and a 1½-knot current would not pose serious obstacles to platform launching.

Offshore drilling structure on way to drilling site on the new type of barge

Launching of drilling structure at offshore site

Model tests indicated that operations could continue even in 8-ft seas.

The new equipment has already set one platform in 53 ft of water approximately 9 miles off the Louisiana Coast and a well is now being drilled. During the launching 4-ft waves and a 2–3-knot current were overcome without difficulty. The present barge can also place larger platforms weighing up to 850 tons in up to 120 ft of water.

Coastal Marine Drilling and Construction Corporation intends to offer the services of this and other controlled-platform launching barges to the rest of the offshore oil industry.

Closing Ceremony of ACHEMA Exhibition and Congress of Chemical Engineering

Nearly 2000 people attended the closing session of the European Congress of Chemical Engineering and the ACHEMA Congress in Frankfurt on 8 June.

This final meeting was opened by the chairman of the DECHEMA, Professor Karl Winnacker, who was also president of the European Congress of Chemical Engineering. Professor Walter Hallstein, president of the Commission of European Common Market, gave a lecture on "The Political Basis of the European Common Market", in which he outlined potential advantages of this great project.

ACHEMA medals, which are tokens of the services rendered to the advancement of chemical engineering by the repeated participation of the recipients in the ACHEMA Congresses, were presented to 178 exhibitors by the managing director of the DECHEMA, Senator Herbert Bretschneider. Among the awards were eight gold medals for firms who had exhibited twelve times at the congresses.

A cheque for DM 250,000 for the Max-Buchner Foundation was made up of contributions of DM 5 per square metre of floor space by the exhibitors and 10 per cent of the fees paid by visiting members of the congress were also donated to the Foundation.

The final address was by Pierre Piganiol, scientific adviser of Cie de Saint-Gobain. He affirmed that chemical engineers were well in advance of current political developments and had come to regard themselves just as much members of the European community as subjects of their own countries.

For the whole period of the congress personal registrations totalled 15,000 congress members and 4300 students from 53 countries. Over 80,000 technologists attended for shorter periods, and about 60 per cent of the personally registered visitors came from countries outside Germany.

New Fuel Flow Test House Opened in South Wales

On 6 June the Minister of Supply, the Rt Hon. Aubrey Jones, M.P., formally opened the new Firth Cleveland Fuel Flow Test House at Treforest, near Pontypridd, Glamorgan. Although the new test house was erected primarily to further testing of products of Simmonds Aerocessories Ltd and its recently formed subsidiary, Firth Cleveland Instruments Ltd, its facilities are available to all manufacturers of equipment concerned with liquid fuels both in Britain and in Western Europe.

The new test house, which consists of a single-storied brick-walled block of three rooms sited close to the factories of both companies, is claimed to be the most extensive of its kind in Europe. Installed in the two flameproof test rooms is apparatus for calibrating and production-testing of flowmeters, water separators, valves, and other fluid-handling equipment which is manufactured by Simmonds Aerocessories Ltd and Firth Cleveland Instruments Ltd.

The control room adjoins the flow-rig room and large communicating windows allow visual reading of the Avery weighing machines which are used to measure mass flow. Separate consoles in the control room provide remote operation of test rigs, and fuel flow lines can be automatically or manually controlled thus permitting programming and automatic test cycles. All primary valves are pneumatically actuated and flow measurements are based on weight of a definite mass of fuel. Instrumentation is comprehensive and covers rate of flow, temperature in working tank, differential pressure across unit under test, gauge pressure in the system, specific gravity of fluid in the line, and weight of fuel in weighing tanks.

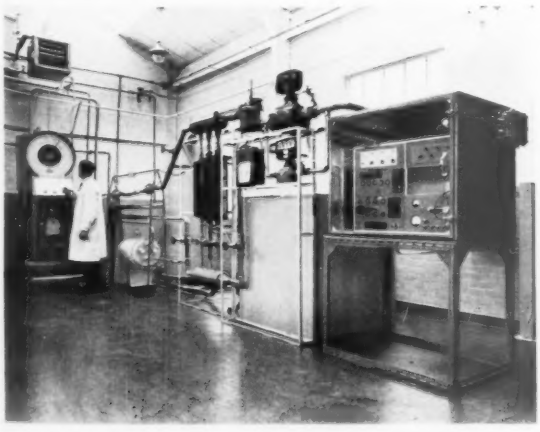
The fuel, which will include Avtur, Avgas, Avtag, and Pool gas oil, is drawn by electric pumps from four 3000-gallon tanks which are sunk in an enclosed concrete well some 15 ft deep. The pump station has three primary fuel lines for flowmeter and instrument work, each line having a flow rate up to 8000 igph. Another main test line is for water separators, filters, and mechanical items; this line has a flow rate up to 60,000 igph. The test rigs may be paralleled to provide additional flow rates. During tests the fuel may be subjected to temperatures between —40° C and +55° C.

The Avery weighing machines, used for flow measurement, in conjunction with Dekatron units and the pulse generator, permit measurements to an accuracy of within 0·2 per cent of the flow rate and total flow in mass unit.

In testing and calibrating Firth Cleveland flowmeters the instruments are mounted in a fuel flowline capable of simulating conditions that the instruments will encounter in flight. The rig enables measurements to be made of average rate of flow, actual fuel quantity, and with different types of fuel.

In the testing of water separators flow rates of up to 60,000 gph are available. Tests determine the efficiency of water removal and the filtration of solid contaminants from hydrocarbon fuels, including Avgas, Avtur, Avtag, and diesel gas oil. Fresh or sea water may also be injected into the stream at the rate of up to 6000 igph to produce a thorough emulsion. All types of Simmonds water separators and Fram separators will be tested under normal running conditions in the new test house.

Equipment on test in the new test house is under the general supervision of the Ministry of Supply Aeronautical Inspectorate Department. Firth Cleveland Instruments Ltd is a Ministry of Supply design-approved firm for aircraft flowmeters and flow-contents gauges and its instruments are fitted to a wide range of British aircraft.



Flowmeter test rig No. 3, with test chamber. In the background is one of the Avery weighing machines used to measure mass flow

Crude Output of Jersey Standard Rises 67,000 b.d. in 1957

Among the facts and figures given in the 1957 Annual Report of the Standard Oil Co., New Jersey, are statistics of crude production of the Company and its affiliates for the past 8 years. In 1957 gross crude output was 2·38 million b.d. compared with 2·32 million b.d. in 1956 and 1·44 million b.d. in 1950. The largest increase in production in any one year occurred in 1951, when output was some 268,000 b.d. greater than in 1950.

Refinery crude runs increased from 1·6 million b.d. in 1950 to 2·42 million b.d. in 1957. The 1957 figure was, however, rather less than that for 1956.

Details of production by companies of the group are given below:—

Company	1957 *Gross crude production* (*Thousands of barrels daily*)	*Refinery crude runs*
Humble Oil & Refining Co. ...	420	234
The Carter Oil Co.	81	23
Esso Standard Oil Co.	—	503
Imperial Oil Ltd	110	267
Creole Petroleum Corp. ...	1149	321
International Petroleum Co. Ltd	135	89
Lago Oil & Transport Co. Ltd...	—	412
Others	1	49
Arabian American Oil Co. ...	298	58
Iraq Petroleum Co. Ltd and associated companies ...	69	1
Iranian Oil Participants Ltd ...	51	20
Standard-Vacuum Oil Co. ...	33	98
Esso Petroleum Co. Ltd ...	—	157
Esso Standard S.A.F.	25	71
Others	17	124
	2389	2427

The 48-page report, which has many illustrations in full colour, also lists an eight-year summary of changes in working capital, a table of investment in property, plant, and equipment, and a 7-page financial review of the year's trading.

Some details of earnings, sales, investment in research, and expenditure in taxes, taken from the report, were included on p. 216 of the June issue of the *IP Review*.

Lubrizol International Laboratories

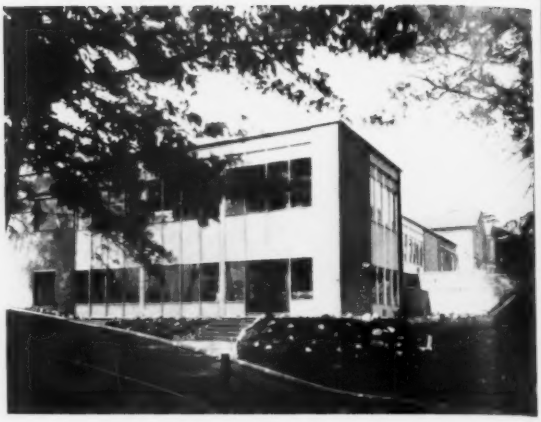
Lubricating Oil Testing at "The Knowle"

One of the most interesting test centres in Britain, and one which is devoted entirely to the testing of lubricants, is "The Knowle", the home of Lubrizol International Laboratories. Lubrizol Great Britain Limited, formerly known as Anglamol Limited, is an affiliate of the Lubrizol Corporation, of Cleveland, Ohio, U.S.A., and is concerned only with the manufacture and marketing of additives for the improvement in the performance of petroleum-base lubricating oils.

Located in Hazelwood, near Derby, these laboratories differ from the general run of petroleum laboratories in one respect. Except for a small chemical laboratory for carrying out certain specification tests and work on used oils from the field, the whole of its work is performed on gasoline or diesel engines or gears. It can be said that this laboratory is, in general, a service laboratory for its customers, who include most oil companies and blenders of lubricating oils. Not the least important of its functions is the examination and certification of oils formulated to meet the American and British military and naval specifications for heavy-duty oils. Lubrizol International Laboratories are one of the organizations authorized to examine such oils submitted for approval for use in all NATO countries.

General assistance is also rendered to the motor trade in helping to solve problems concerning materials and lubrication. Much work has been done in reference to valve gear and to back axles.

The Company's products, which are manufactured almost wholly in Britain at the Oldbury works of Albright & Wilson Ltd, are also tested at "The Knowle". Research as such is not one of its functions; this is mainly carried out at the Cleveland laboratories of the parent company, but some formulation of new types of lubricants is undertaken. The laboratory is also equipped to undertake new work as required, such as the testing of additives for lubricants for limited slip differentials, automatic transmissions, etc.



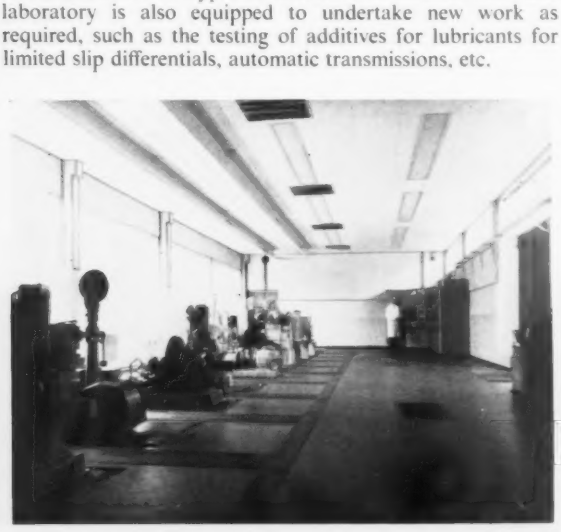
The new chassis dynamometer shop and other buildings at Hazelwood

The Laboratories

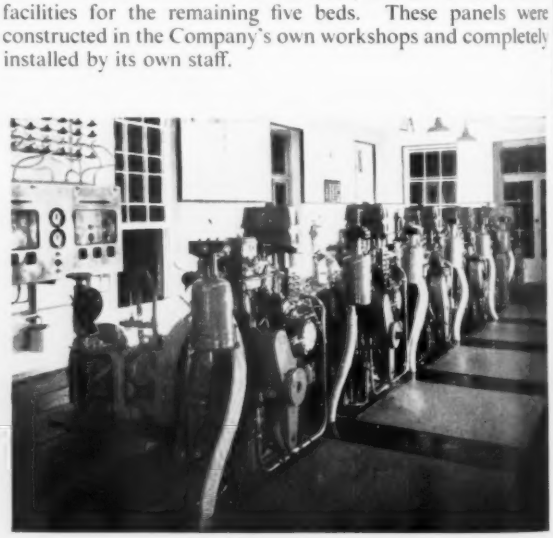
First opened in 1946 when "The Knowle" was acquired and converted into an engine test house with the necessary ancillary rooms and offices, there has recently been a considerable extension of the premises. In particular a complete new engine test house has been completed structurally and will soon be fully operational.

The main engine laboratory of the new building contains eleven test beds, each of which consists of a spring-mounted concrete block and facilities for the mounting of any type of engine. Fuel is supplied to each bed through any one of six main lines, two of which are for gasoline and four for diesel fuel. Electricity and all other services to the beds are brought from a main service tunnel under one side of the building. Exhaust gases are also taken out *via* the service tunnel and vented to atmosphere through one main stack.

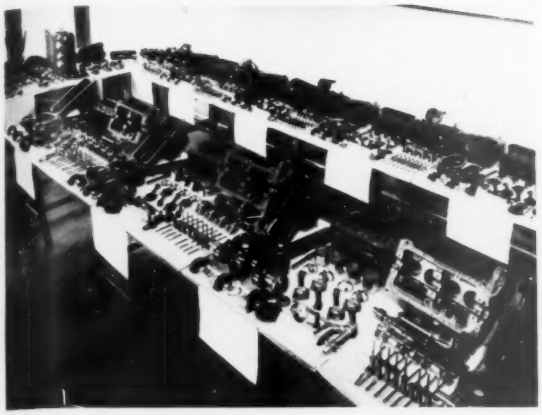
There are two main control panels; one carries the instruments and controls for six of the beds, and the other similar facilities for the remaining five beds. These panels were constructed in the Company's own workshops and completely installed by its own staff.



Engine installation in progress in new test house



Arrangement of six Caterpillar L-1 diesel test engines



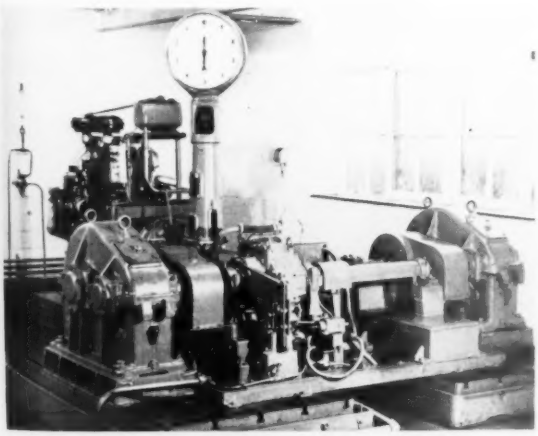
Components of cars used on the road test stripped and laid out for inspection

At the time of our visit, six engines were being installed or prepared for operation. These consisted of two Petter AVI single-cylinder oil test engines mounted on a common bed for preliminary investigation of bearing corrosion, two Chevrolet engines for L-4 for bearing corrosion testing, a Rover 90 for valve-gear wear tests, and a Volkswagen. Included in a list of engines it is intended to install are a six-cylinder Bentley power unit and a C.L.R. single-cylinder oil test unit.

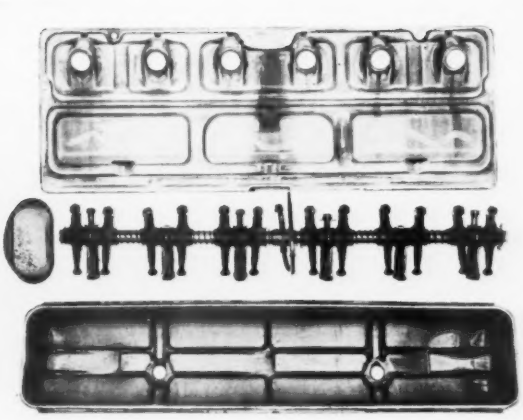
The remaining beds in the new building will be occupied by diesel and gasoline engines, which will be selected as dictated by operational difficulties as they occur in service. Provision is also being made for a bench to accommodate six small petrol 2-stroke engines, varying in size from 50 to 250 cc.

Other parts of the new building will be occupied by the necessary fitting, instrument, and electrical shops. These will be used to service the engines, the instruments, and ancillary equipment.

Arrangements are also being made to install a chassis dynamometer so that simulated road tests can be carried out under carefully controlled conditions. It is understood that one of the controlled conditions will be the air-flow past the vehicle so that it will be equivalent to actual road conditions at the same speed.



General view of high-torque Vanguard axle rig



An example of excellent photography. Chevrolet components after test

Existing Engine Laboratory

The equipment in the present engine laboratory consisted of a wide variety of test engines and equipment, as follows:

- 6 Caterpillar L.1 single-cylinder diesels;
- 4 Petter AVI single-cylinder diesels;
- 1 General Motors supercharged 2-stroke diesel;
- 1 Commer TS 3 supercharged 2-stroke diesel;
- 1 International Harvester tractor engine;
- 2 single-cylinder Gardner IL2 oil test units;
- 1 MWM single-cylinder diesel;
- 1 two-cylinder Gardner diesel, used for certain tests and also to generate electricity for some test engines;
- 1 Vanguard high-torque axle rig on which hypoid oils are tested.

The International Harvester is an example of the Company's policy of purchasing new engine types as they become available. This enables them to obtain first-hand data on the correct oil formulation.

Up to the present the question of marine diesel lubrication has not featured in the Company's programme to any extent, but arrangements are being made to install a Bolnes marine diesel in order that such an investigation may be undertaken.

A special shop is also provided where engines are completely stripped after a test run and later re-assembled for a new test. This avoids the possibility of any contamination which might occur if this work were carried out in the general engineering shop.

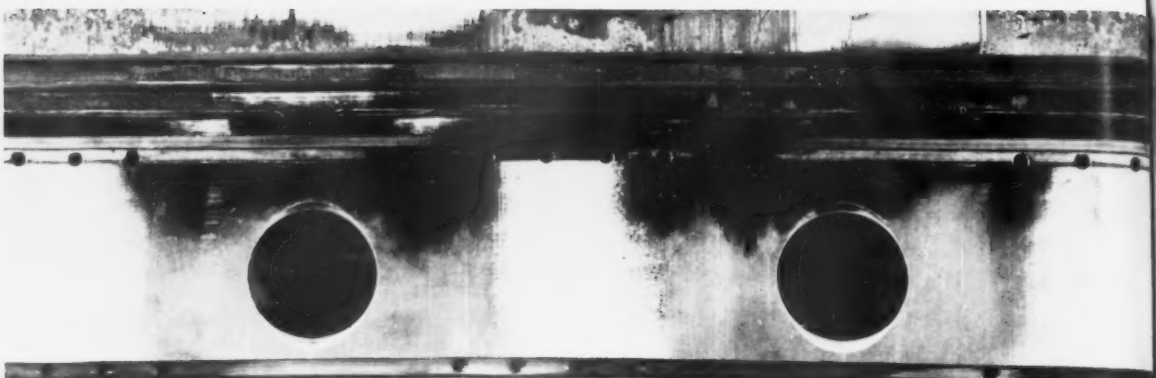
25,000-Mile Road Trials

During the past two years the Company has been carrying out an extensive series of road tests, for which the following cars have been used: four Hillman Minxes; five Morris Minors; two Triumph TR2's; and two Vauxhall Veloxes.

Before the test commenced, each engine was stripped and checked to ensure that all dimensions were correct to makers' tolerances. Necessary adjustments were made and engines selectively re-assembled.

During the test, each car travelled 25,000 miles, speeds not being allowed to exceed 40 mph, and daily mileages being kept below 100. Drivers were changed every fortnight and cars were kept in the open, whatever the weather.

Two base oils were used, a straight SAE 10W/30 and an SAE 20, for test in one set of engines. In duplicate engines



A flat photograph showing the complete circumference of a piston after test

the same oils, treated to Supplement I level by the use of detergent and anti-oxidation additives, were used.

The tests having been completed shortly prior to our visit, the engines had been completely dismantled and were laid out for inspection. The effect of the additives was, to say the least, very striking. The cylinders, liners, bearings, and other parts of the engines in which the treated oils had been used were bright and clean in comparison with those in which untreated oil was the lubricant. In the latter cases the piston and cylinder bores were badly lacquered, and the filters clogged with sludge. It was reported that in one case it had been necessary to remove sludge from the filter during the test in order to permit the oil to continue to flow.

The following extract from typical results on a Morris Minor gives an idea of the advantages of additive oils:

Wear measurements:	*Straight oil Inch*	*Treated oil Inch*
Average increase in cylinder bore dia.	0·0084	0·0031
Bearing wear	Nil	Nil
Journal wear	0·0006	Nil
Average cam wear	0·0019	0·0001
Cleanliness merit rating (maximum 100)	48·2	80·5

Over the mileage considered the lubricating oil was found to have negligible effect on the fuel consumption.

Low-temperature Corrosion

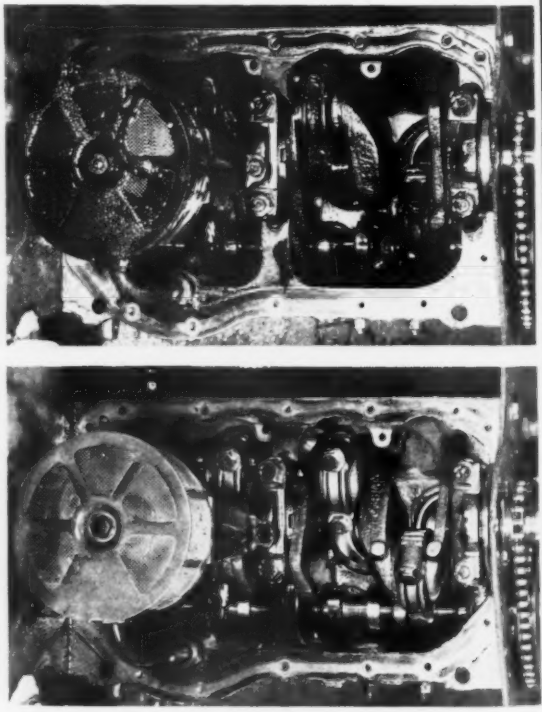
An interesting series of tests to determine the influence of lubricating oil on low-temperature corrosion of 2-stroke anti-friction bearings is now being carried out. For this purpose a motor-cycle is used and after each road circuit of approximately one mile the crankcase is cooled to a temperature of below 10 C. before commencing the next cycle. By this means substantial corrosion can be produced on some oils in 150 miles running.

Photographic Records

An important part of the work at "The Knowle" is the provision of a photographic record of engine parts, not only for approval reports but also for records.

For this purpose an efficient photographic section is available which has many excellent features. In taking such photos it is essential to avoid any shadow and to have perfec lighting. When a piston is being photographed it is stoo on a white base and is completely surrounded by white This ensures that the main lights are reflected equally to a parts of the piston.

Another ingenious device produces a flat photograph o the complete circumference of the piston. The piston stand



Additive effect is clearly shown in this comparison of engine lower halves after using untreated and treated oils

on a base which slowly rotates past a slot in the containing-wall. The camera also stands on a base rotating around a point immediately below the focal point. The two stands are coupled so that the image travels across the photograph plate to give the flat picture.

For the photographing of complete engine parts, the parts are assembled on a flat glass plate, covered with grease-proof paper, in the bottom of a special cabinet. A strong light under the glass plate provides a perfectly clear background, while strong top lights reflected by the white walls of the cabinet provide shadowless illumination of the parts.

ESSO'S MILFORD HAVEN REFINERY

Esso Petroleum Company Ltd has announced that it has now decided to proceed with the building of a refinery and a marine installation near Milford Haven. Site preparation has already commenced and the refinery is expected to be ready for operation by the end of 1960 or early in 1961. The estimated cost is £18 million. Planning permission has been granted over a site of 350 acres out of a total 1000 acres which the Company has acquired, as previously announced.

Planned initially to process 4·5 million tons of crude oil per annum or about 3·5 million gallons per day, the main products from the refinery will be motor and aviation spirit, jet fuels, diesel fuels, and marine and industrial fuels.

The Marine Terminal

The marine terminal will be capable of handling simultaneously two tankers of up to 100,000 dw tons each and provision is made for expansion as and when the need arises. Special precautions will be taken to prevent the current and silt deposition pattern in Milford Haven being disturbed and the berth will be of open-pile construction.

Every endeavour will be made to preserve the beauty and amenities of the surrounding countryside as has already been done at Fawley, the Company's other refinery, and the most modern measures for the control of pollution will be incorporated in the refinery. The major units will all be cooled by air rather than by using salt water.

The refinery has been designed by Esso Research & Engineering Company and will be fabricated by Foster Wheeler Ltd. Other contractors include: The Motherwell Bridge and Engineering Co. Ltd, Wm. Neill & Son (St Helens) Ltd, Whessoe Ltd, Geo. Wimpey & Co. Ltd, and for the marine terminal J. Mowlem & Co. Ltd.

The Company states that the above information is given as a result of the following statement which has been made with the authority of the Crown Estate Commissioners:—

The Crown Estate Commissioners and the Esso Petroleum Company make the following announcement. In order to fulfil their common wish that work on the construction of the proposed Esso refinery at Milford Haven should proceed as speedily as possible, the Commissioners and the Company have agreed upon the following arrangements. The rent to be payable for the facilities required by the Company from the Commissioners under a long lease will clearly need further consideration. In the meanwhile the Company will be permitted to proceed with their works forthwith under an agreement for a lease providing for payment of a peppercorn rent during the period of construction, for a rent (representing a compromise between the views of the Commissioners and the Company) from the completion of the works until the grant of a lease, and for the eventual granting of a long lease at a rent yet to be agreed.

Petroleum in Parliament

Oil Imports Carried by British Ships

On 30 April Mr Neave, Joint Parliamentary Secretary to the Ministry of Transport and Civil Aviation, said that it was estimated that in the years 1954, 1955, 1956, and 1957, 41 per cent, 40 per cent, 38 per cent, and 36 per cent respectively of the oil imported into Britain was carried in ships flying the British flag, but the actual quantity of oil imported in such ships remained about the same.

During these four years the total British tanker tonnage had increased by about 21 per cent but many British tankers were employed on voyages which did not bring them to the United Kingdom. Oil imports had increased from 35 million tons to 39 million tons during the years in question.

Purchase Tax Revenue from Oil Heaters

On 6 May the Chancellor of the Exchequer said that the yield from the purchase tax on oil heaters for 1958–59 was estimated to be about £1½ million.

Proposed Refinery in Kenya

On 8 May the Secretary of State for the Colonies said that the Kenya Government had acquired a site south of Mombasa and had leased it to the Anglo-Saxon Petroleum Company to enable them to construct an oil refinery. Negotiations were continuing between the Company and the Government over certain points which affected a final decision by the Company.

Hydrocarbon Oils Duty

In a written reply on 3 July, the Financial Secretary to the Treasury gave the following details of the amount of light and heavy hydrocarbon oils retained for home consumption during the year ended 31 March 1958, and the net amount received in respect of duty thereon:—

Class	*Quantity*	*Receipts of Duty*
	Gallons	£
Oils chargeable with Customs duty		
Light oils	2,028,119,842	*254,816,656
Of which motor (including aviation) spirit	(1,979,788,782)	(248,777,393)
Heavy oils:		
For use as road fuel	483,287,216	60,891,285
Other (mainly lubricating oils)	152,202,922	634,179
Oils chargeable with Excise duty:		
Light oils	136,354,219	8,721,370
Of which motor (including aviation) spirit	(82,731,071)	(5,258,245)
Heavy oils for use as road fuel	24,277,051	1,544,386
Total	—	326,607,826
Allowance on certain home produced oils used in approved refineries as raw material for chemical synthesis	—	4,845,421
Net Total	—	321,762,405

These particulars relate to oil subject to a net liability to Customs or Excise Duty; comparable figures are not available in respect of heavy oils for which the duty is wholly rebated.

* Includes £19,221 in respect of light oils contained in composite goods on which oil duty was charged at a flat rate under the Composite Goods Order, 1957, and for which information as to the quantity of oil is not available.

Iraq Oil in 1957

Remarkable progress in overcoming difficulties and in bringing prosperity to the inhabitants of a largely sterile region is exemplified in the annual report of the year's activities of the Iraq Petroleum Co. and associated Companies, which has just been issued under the title *Iraq Oil in* 1957.

When the year opened the oil industry in Iraq was suffering severely from the blow dealt by the destruction of the pumping stations in Syria. This grievous interruption to the export of oil from Kirkuk lasted four months and its effect is seen in the reduction of some 10 million tons in production for 1957 compared with 1956. Nevertheless, combined output for local use and export reached 11,657,497 tons from Kirkuk in 1957. Footage drilled in the concessionary areas declined by 30,878 ft in 1957 compared with the previous year.

Despite the setback of the loss of the pumping stations the Company pressed ahead with projects to increase production. Changes to handle increased throughput were made at Kirkuk and on the pipeline stations. They included two schemes to counteract declining pressure in the Kirkuk field and the provision of new pumping plant at K1 and T1 stations. The rate of output rose steadily from the 4·9 million tons per year rate achieved after resumption of pumping in March to 16·5 million tons at the end of the year.

The Basrah Petroleum Company, from its fields at Zubair and Rumaila, increased production by some 700,000 tons. A second gathering centre had to be established at Rumaila, and a new gas turbine was installed. A 16-inch pipeline was constructed from Rumaila to Zubair.

At Fao loading terminal on the Persian Gulf navigational conditions on the Shatt-al-Arab improved to permit the berthing of tankers of up to 26,000 tons by the end of the year. Four additional storage tanks, erected in 1956, brought the terminal's total storage capacity to 382,000 tons. Exports from Fao increased in 1957 to 8,936,409 tons, carried in 570 tankers, compared with 8,168,168, carried in 541 tankers in 1956.

The Mosul Petroleum Co. also reports the same trend to a decrease in output in 1957, but by the end of the year Ain Zalah and Butmah were again in full production. From these fields 564,377 tons were produced during the year. To maintain reservoir pressure gas was injected into the Butmah field first pay, first from Ain Zalah and later by higher pressure gas from the Butmah Triassic Zone, taken from Butmah No. 2 after a well head gas/oil separator had been installed.

Training schemes by all three companies continued to make good progress. The Industrial Training Centre at Kirkuk provided courses for 300 full-time apprentices and 34 courses for over 500 adult employees in evening classes. Of six apprentices entered for the City and Guilds Petroleum Technology Intermediate Examination, five obtained a first-class pass. Training in the area of the Basrah Petroleum Co. was intensified and greater numbers of employees were sent abroad on courses. Facilities were again extended for the practical training of students of the Government Technical School in the Company's workshops during school holidays. The Mosul Petroleum Co., whose senior personnel includes some 30 per cent Iraqis, reports good progress during the year. Six Iraqis attended courses in the U.K. or elsewhere in Europe and eight trainee drillers were working on a five-year course.

This report also devotes much space to a consideration of the economic development of Iraq. A new era of financial stability was opened in 1951 with the profit-sharing agreement between the Companies and the Iraqi Government. This resulted in the Government's revenues from oil rising from £13·9 million in 1951 to £73·7 in 1955. The Iraq Development Board was formed in 1950 to administer major projects implemented by the Board itself or projects implemented under its supervision by various ministries. The Board receives 70 per cent of the oil revenues and its objective is broadly to raise the standard of living. Its projects include flood-control, irrigation, drainage, water supply, better communications, improvement of indigenous industries, and the provision of more and better houses, schools, and hospitals.

Two outstanding projects to control flooding are the Wadi Thathar scheme and the Habbaniyah scheme. The first consists of a barrage across the Tigris at Samarra with steel sluice-gates that can divert water into an artificial cut. The digging of the cut involved moving some 47 million cubic metres of earth, which is believed to be the largest single earth-moving contract ever undertaken. The project, which cost £16·5 million, was inaugurated by King Feisal II in the spring of 1956. The Habbaniyah scheme, which also makes use of a barrage to divert the flood water from the Euphrates into the Habbaniyah lake, was inaugurated during Iraq's first development week in 1956 and is expected to cost £4·5 million. A dam is being built in the Dokan gorge to store the waters of the Lesser Zab in a huge artificial lake with a capacity of 6 milliard cubic metres. Construction was begun in 1954 and the estimated cost is about £13–£15 million. Another dam is under construction on the Diyalah river and will provide a lake with a capacity of 3·5 milliard cubic metres.

On communications £87 million is to be spent during the period 1956–60 on roads and bridges, £25 million on railways, and £9 million on airports. By the end of 1957 eight new bridges had been completed or were approaching completion. A standard-gauge railway is to be built from Baghdad to Basrah which will take in Kut and Nasiriyah. This will provide an additional north to south railway link. Oil-fired steam locomotives will be replaced by diesel trains and £25 million has been allocated for railway development.

A new Baghdad airport, not under construction in 1957, is estimated to cost nearly £4 million and a similar sum is reserved for improving and constructing other airfields. The Board aims at diversifying the country's industries and in addition to allocated loans to the Government's Oil Refineries Administration has inaugurated a large cotton textile plant at Mosul which is claimed to provide one-third the country's requirements, a cement factory near Sulaimaniyah, and a sugar factory at Mosul due for completion next April. Electric power will be supplied by three stations at Dibbis, near Kirkuk, at Baghdad, and at Basrah. The first two are under construction and work will start shortly at the third. The total cost of the power programme, including housing schemes and training of technicians, is estimated at £17 million. The estimated use of oil revenues for the period 1955–60 is given as follows: control of water, irrigation, drainage, and agriculture, £154 million; roads, £64 million; bridges, £23 million; airports, £9 million; railways, £25 million; ports, £4 million; industry, £67 million; housing, £24 million; public buildings, £21 million; and health and education, £16 million.

The Purpose and Principles of Industrial Training*

By R. S. BUTLER, B.Sc. (Econ)†

Historical Background

One of the main antecedents of all industrial training is the apprenticeship system, which goes back to the early days of the Guilds and Craft apprenticeships. With the breakdown of the apprenticeship system in the eighteenth and nineteenth centuries particularly, there was for a long period a lapse of formal training. There was not much indication of a revival until just before the first world war, when one or two firms, progressive in personnel management, introduced schemes of training for young people.

During world war I, Government training centres were established for training semi-skilled people to meet the vast increase of munitions work. In the immediate post-war period, the Industrial Health Research Board and the National Institute of Industrial Psychology were busy, amongst their other activities, in advising industry on training schemes. The depression caused a set-back to the development of training in the early 1930s but, following the depression, Government training centres were opened to re-equip men for new occupations in the distressed areas and the expanding industrial areas. More recently, there was, during world war II, the tremendous development of the Training Within Industry programmes, designed to give intensive training to many thousands of newly promoted supervisors, in job instruction, job relations, and job methods.

In the post-war period, through many of the National Joint Advisory Councils, composed of employers' representatives and trade union officials at national level, extensive and detailed schemes of youth education have been organized. Many of these are new apprenticeship schemes, setting minimum standards and common syllabuses for an industry. There has also been a considerable extension of foremanship training, and then of management training and the currently fashionable management development schemes. A great deal more emphasis has also been given to induction training. Many of these activities reflect, of course, upon industries' major contemporary concern—the scarcity of people, particularly the scarcity of qualified people.

During the past year (1956), everyone has become aware of the concern in Britain for the future supply of scientists and technologists—particularly engineers. Many firms are now actively preparing "sandwich course" schemes to provide for themselves, within quite a short period, an assured supply of qualified scientists and technologists.

Two Objectives

The objectives of training, in so far as certain objectives can be seen to be the aim of all forms of training, are as follows:—

First, training should be geared to the nature of the organization which it serves. It must grow out of that organization; it must be part of it, therefore, and it must change with it. In the petroleum industry, there are a number of features which set the framework in which training must operate:—

(1) As an industry, and in regard to many of its constituent firms, it is very large and continuously growing.
(2) It is highly technical in many branches of its activities, and the theories and data of its basic disciplines and techniques undergo changes and additions.
(3) There is a high capital-to-labour cost ratio in its products, and, associated with that, a high figure for capital invested per employee.

It may be deduced from this—and it has been evidenced in many statements made by leaders in the oil industry—that an oil company's employees are its greatest assest. This may seem paradoxical in view of the industry's vast capital investments, yet it indicates the way in which training within the oil industry takes cognisance of these vital features of the industry.

The second objective is that training should be based on present and projected needs; it must be related to the objectives of management, its present and projected operational targets, and the need to maintain itself as a team organization, to replace itself with people, organizational procedures, and structures.

This indeed makes training an integral activity of management. As such, training will be governed by the exercise of management functions; it will be subject to planning direction, co-ordination, and control. It must recognize those principles, the application of which has been found to make management more effective, such as the span of control, delegation of authority, and the use of staff groups. Training schemes must be challenged—as are other activities of management—by such questions as "What should it be doing?", "When should it take place?", "How much training should there be at any one time?", "Who should receive training?" and "How should it be done?"

* Paper read to IP London Branch on 25 March 1957.
† Esso Petroleum Co. Ltd.

Some Concepts of Industrial Training

When these two objectives have been accepted, the work of formulating training policies and plans can be guided by several widely-held concepts:—

(1) That training is not a matter of choice because—consciously or unconsciously—training is always taking place; employees are, in fact, receiving training of a kind even when it is being formally neglected. To meet the changing needs of an organization, there is a continuous process of self-adaptation and self-teaching. Organized training can enhance the rapidity and effectiveness of this process.

(2) Accordingly, training is the company's business. If left to the individual's choice it will take many forms and achieve varying degrees of effectiveness; as the company's business it can be organized more appropriately and more uniformly.

3) As part of the company's business and as a management activity, it is a line responsibility. Training staff in advisory positions cannot know intimately the current and pressing need in each and every department. Managers and supervisors faced with operational problems are in the best—sometimes the only—position to know, but may need help and advice to clarify their understanding of the situation and to identify that part of it which constitutes a training need. Whilst seeking and obtaining advice the manager can never abrogate his responsibility—it is there—and his—always.

(4) Training is worth doing well. Effectively organized training has been shown to contribute to improved performance. Time taken in careful planning and execution should therefore be well repaid.

(5) Training must always be secondary to the company's major operating needs, and related to them. It must be subject to priorities; some training activities are essential and must not be delayed. For example, the commissioning of a new plant may have been scheduled to "tie in" with the running operations of other plants, and the launching of an advertising campaign to announce a new marketing policy. Training to prepare for that "start-up" must obviously have priority. Other training can be deferred if operational activities or a more important training need show that they should have priority.

The Learning Process

The effectiveness of training has been shown to be related to the application of principles of learning, which are known to operate during the processes of perception, comprehension, and retention of new skills, knowledge, and attitudes.

It is found that going from the well-known to the less-known or the unknown is a logical sequence which builds up from established knowledge, and facilitates the transference of knowledge by an understanding of causal relationships. Again, learning which proceeds from the parts to the whole is a sound principle to observe, so long as the whole is perceived from the beginning and the parts are seen to be related to it.

The motivation of those receiving training should always be borne in mind. They should be aware of the purpose of their training and be able to relate it to their individual needs and thus be able to perceive what benefit this training can bring them. As training proceeds, knowledge of results, stage by stage, enables them to assess their performance, and from this sense of achievement the will to learn and improve is strengthened.

Processes of learning are accelerated and consolidated when more than one sense is employed. It is known that what is heard is reinforced when it is also seen, and both can often be enhanced when the kinaesthetic sense is employed. Variations in the pace of instruction also affect the rate of learning. Most people can probably recall instances of "build-up" or alterations of pace during different phases of training courses.

The Main Forms of Training

The four main forms of training when related to an organization's needs are:—

(1) Replacement training linked to manpower budgeting.

(2) A "once only" form of training preparatory to the commissioning of new plant or equipment.

(3) Individual improvement training, which is continually taking place.

(4) Training which emerges from observing symptoms of operational problems.

Manpower Budgeting

Manpower budgeting takes place when a company, in planning its future activities involving capital expansion, modifications to its procedures or activities, or changes in their locations, thereby takes manpower decisions—decisions about the number of people who are to be employed, the nature of their duties, and the skills and qualifications they will need for that work. Such financial and physical planning will be abortive unless it is paralleled by manpower planning, so that at the end a trained man is in the right place at the right time. In all cases, it will require replacements to make good losses which are estimated to occur during the planning period through promotions, resignations, and retirements, and these can be forecast in advance with a useful degree of accuracy. In some cases, it will also require increases in existing establishments.

Thresholds of Responsibility

In a company's organization, it is possible to distinguish a number of important stages in employees' careers of promotion through the organization. It is convenient to look upon the transition from one such stage to the next as a "threshold", to denote a major change or increase in responsibility or authority, or both. Where such a threshold exists in many similar units of a company, they will be found to have many common elements.

As examples, one can see such major changes from the category of office staff to salesman; from salesman or engineer into junior management; from junior management in charge of physical operations—such as a sales district or a refinery plant—to management of an administrative headquarters, not directly concerned with day-to-day supervision of operations.

In organizations where operatives cross the threshold into the junior ranks of supervision, a number of training needs can be recognized common to these transitions of responsibility and authority: changing attitudes calling for a shift of emphasis in loyalties from the Union and their workmates in the main to a loyalty to the company and their fellow supervisors; needs for increased social skills—skills in handling manpower problems, and in assessing and interviewing employees under their supervision.

At each of these thresholds the elements of change common to a number of comparable units can be established by asking two questions: "What knowledge, skills, or attitudes does this job require of those who have been selected?" and "What are the existing knowledge, skills, and attitudes of those who are being prepared for promotion?" The gap, or difference, in respect of each individual constitutes his unique training need.

When these questions have been applied to a number of promotions over the same threshold, many are found to show similar difficiencies. To the extent that appropriate training courses can be devised, a common pattern of training can be planned, leaving managers to cater for individuals' specific requirements by unique individual arrangements.

When this analytical method has been applied to all of these thresholds, a pattern of related training courses can be produced which meets common needs at each of these main stages, and contributes to the achievement of a company's manpower objectives by assisting in the long-term replacement of people.

These concepts can be illustrated by the thresholds of two patterns of career development frequently found in the oil industry:

The Salesman to Sales Manager

Salesman.
Administrative assistant.
District manager.
Product manager, Division, or Head Office.
Divisional manager.
General Sales Manager.

The Specialist via Supervisor to General Manager

Engineer—accountant—purchasing assistant, etc.
Section head.
Senior supervisor.
Junior manager.
Manager of minor department.
Assistant manager, major department.
Head of major department.

In one study, analysis of the threshold of first-line supervision in offices yielded many common elements of supervision. Amongst these, "human relations" skills predominated, and therefore provided the nucleus of a training course which has been developed.

Human Relations Skills for First-line Supervisors

The elements of supervision.
Job relations.
Problems of letter writing.
Communication.
Conducting and participating in meetings.
Assessing job performance.
Cost control in the office.
Organization and planning.

Many individual training needs, of course, remain to be met in other ways.

Other courses have been developed on both departmental and company bases. Residential training facilities external to the company are used selectively as a supplementary means of meeting the company's career development needs. The integration of all these resources is illustrated, in simplified form, in Fig 1.

"Start-up" Training

A different approach is taken to the second group of training activities in preparation for the commissioning of new plant. Manpower requirements are first established; then a plant start-up schedule is prepared by working backwards from the final date by which equipment and crew have to be ready to operate. The final stage will be "team training", when the operators are learning to perform their duties together in "start-up", normal running, emergency, and scheduled turn-around procedures. Prior to that, there has been practical job training of individuals in the performance of their specific duties. This phase will have been preceded by group instruction, mainly by lectures, in the plant's construction and processes. Earlier still, the plant supervisor will have been preparing his operators' training programmes, and, in the process, consolidating his own development, which will have included training in his technical, supervisory, and "trainer's" duties. In the case of any one plant, such a carefully planned programme will probably span about twelve to fifteen months.

Individual Job Training

The third group provides individual instruction for initial and job-improvement training. Whilst this form of training is continuously taking place, often unconsciously, there is scope for improvement by the use of systematic methods. For initial job training there is the T.W.I. job instruction method, which employs the four-step approach of preparing the learner, demonstrating the job, having the learner do the job, and following-up after he has learnt to do it. But job training is not often completed by this method alone. In some cases, some aspects of performance do not reach the level of the best; in others, the duties of the job in question change with time or technical innovations. It is suggested that there is a great deal of scope for coaching people to improve already satisfactory job performances; managers and supervisors should be

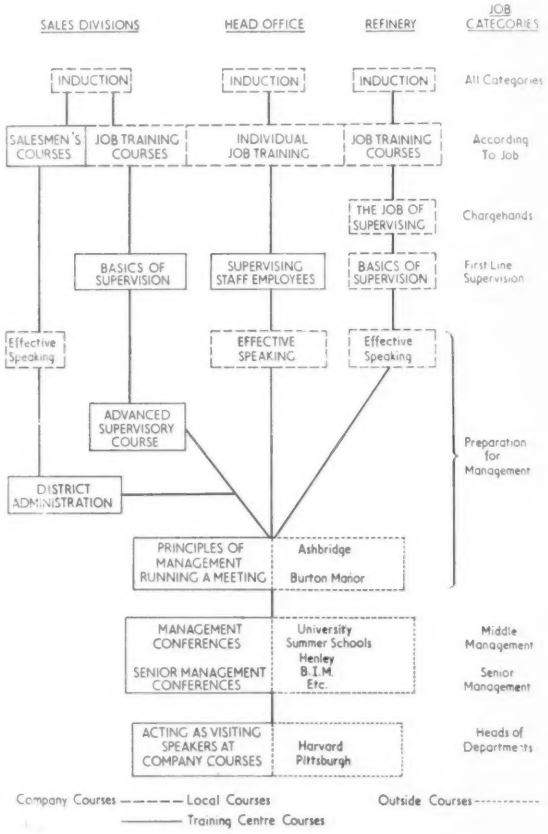


Fig 1. Integration of career development needs and organized training courses

encouraged to gain skill in improving peoples' performance by personal coaching. The procedure which many companies follow of assessing the performance of their staff annually, and identifying those duties where there is room for improvement, can indicate their present training needs which can be met by the individual coaching method.

Operational Problems

The fourth group is derived from operational symptoms which suggest underlying training needs. For example, there may be recurrent failures to meet output or sales targets or delivery dates. For each of these symptoms there will be suitable methods of analysing the problem to determine whether there is a training need concealed behind the symptom. It may be a matter of looking for bottlenecks in the work flow, comparing one employee's output with another's, examining individual or team work-loads—a work study approach, it might be called. A high rate of labour turnover may be another symptom which should cause concern. Reports from systematic exit interviews, attempting to probe the reasons why people are leaving, when studied, may indicate common features which highlight a training need. The introduction of new products, operations, or procedures, a study of the plant operating manuals, discussion with technical planning staff, or a study of the job descriptions for new staff—any of these may draw attention to training needs.

Another type of operational problem is illustrated by frequency of errors or plant failure, or a high spoilage rate. Here, a study of customers' complaints may point to individual or group training needs, such as a salesman dealing with a certain range of products. Inspection of raw materials or of the plants themselves may reveal training needs amongst the plant operators or the producers of the material.

Analysis, which has revealed shortcomings in operatives' work standards, may also indicate inadequate preparation of managers for appointment. This, and other symptoms at the management level, such as a scarcity of management replacements, may also call for a "training" analysis. It may be that the organization is not able to produce enough people of management potential in sufficient time. It may be that the "replacement programme" has not been started soon enough.

A method of approaching these operational problems can be offered, which is sufficiently general to be useful at all organizational levels:

A Procedure for Determining Training Needs

(1) Identify the operating or management problems where training may be required.
(2) Analyse each part to determine what part may be solved by training.
(3) Trace the training need to groups of employees.
(4) Determine each individual's training needs.

Having thus delimited the task, a collaborative training activity can then be prepared between departmental management and the training specialist. Working together, they may well be helped by the following planning framework:—

Steps in Planning a Training Activity

Clarify ...	Definition of need. Statement of objectives.
Plan	Analysis of contents. Methods of instruction. Selection of instructors and participants. Method of follow-up.
Develop and Test	Assemble material. Determine audiovisual aids. Co-ordinate the components of the programme. Arrange "practice sessions".
Administer ...	Determine "briefing procedure". Arrange nominations and speakers. Plan for "feed back" during and after course.
Follow-up ...	Obtain management reports. Arrange full follow-up by training staff.

Training Resources

The training resources available to an organization can be considered in three main groups:

Opportunities for individual training, to be given by the immediate supervisor or by another department of the company—by instruction or demonstration, by planned experience such as committee or study group work, by personal coaching, or by directed reading.

Facilities for group training, whether by departmental or company-wide courses, either of which may be held residentially. Many methods are available and, in fact, used; lecture and discussion, case studies, syndicates' projects presented as reports to a panel, and role-playing, are employed separately, or in combination on appropriate subjects.

The use of organizations external to the company, such as a correspondence course, educational studies in one's spare-time, or attendance at one of the many short residential courses. Here again, methods will vary—private study, class work, and tutorials are perhaps three of the main methods.

The Interdependence of Management Coaching and Residential Courses

In conclusion, it is desirable to consider the complementary nature of individual coaching by management, and the residential courses which a company may be using.

There can be a danger in the support which management is apparently giving to its training department by encouraging residential courses, and ensuring that their staff are free to attend them. Management may come to think, perhaps not consciously, "Well, the training department has got the company's courses organized; training is taking place over there; our job is done". This is a very limited and rather dangerous view which should be actively discouraged. In the first place, this attitude can cause things to be left undone; by assuming that all the necessary training will take place in the training centre, a manager may do very little for his staff before he attends the training course; in these circumstances, there will be very little pre-course briefing which could relate this training to his own position and his own needs, and prepare him to be receptive to the benefit which he can get from it.

The opportunity for "follow-up" may also be missed because it is assumed that training is completed when the individual returns to his organization. On the contrary, any impact which the course may have had upon him can be negatived if, as a "changed" man, he returns to an unchanged environment. The course may heighten his powers of observation and analysis, and enable him, upon return, to see for the first time organizational and personal shortcomings. A course in management, in which much time has been spent on delegation of authority, will seem a little incongruous and be

somewhat disturbing if, on return, delegation of authority is noticeable by its absence.

It is suggested that there is room for a great deal to be done in relating, on an individual basis, the purpose and content of a training course to the work of the department upon return. Thus could be put to good use the additional skills and knowledge which the individual has acquired in his training programme. As a by-product, a readjustment of where the individual and the supervisor stand in relation to one another can usefully take place if the opportunity is taken of "follow-up".

If briefing and follow-up do not take place, there is danger that the course will become isolated from the mainstream of management activities, and thereby increasingly unreal. Instructors may come to feel that they are no longer a vital part of the organization, another problem to be added to the many they have in connexion with the administration of the courses. Of these, a central problem is whether there is a clear company policy on using, or not using, training courses for the assessment of individuals' performances. Whether there is an explicit policy or not, there may well be some individuals who will feel themselves under scrutiny. Their behaviour may then be affected, perhaps detrimentally, to the benefit they would otherwise derive from the course. If necessary, it is important to face this situation, and assure those attending that they are free to relax and be themselves without concern about the company's assessment of them as individuals.

Another problem which may well have to be faced is the impact of taking part in one of these courses on some individuals who are not familiar with this kind of experience. The challenge of a course—and there are many novel features about it—meeting new people in a strange place, tackling what are in some cases theoretical subjects, reacting to "stress" situations involving individuals in a group, an unusually vocal form of individual existence—any of these experiences may cause considerable stress to a point where a member of the course may well be best relieved of his attendance. This involves the training staff concerned with the course in delicate questions of confidentiality. Does he regard this as private information, or does he feel that it is his duty in that person's interest to convey this to the individual's manager? How does he overcome the loss of face which the individual will suffer? If the withdrawal of one individual affects the other members of the course, how does the training officer rebuild their morale? To the extent that systematic coaching and briefing of those attending courses are integrated with the courses' objectives, the training officers concerned with the administration of courses can be greatly aided in handling some of these delicate problems. In many cases, they will be advised by management of some of the potential difficulties which certain people attending a course will bring with them. To be forewarned is often to be forearmed!

In the foregoing, an attempt has been made to present some basic principles of training in relation to an organization's objectives; some concepts whereby training can be geared to these objectives; the application of a simple training formula on a manpower analysis basis was shown to lead to a pattern of group training which meets the common needs of people crossing certain major thresholds in their career development; and after outlining three other forms which training takes, a fresh look has been taken at the position which these group courses should hold; not an all-important, not an over-riding one, but a supplementary position in relation to continuous guidance, which will permit such individual guidance and group experience to enhance each other.

Discussion

Reference was made to the pre-war practice, particularly on the sales side of an organization, of training a man who was familiar with the petroleum industry and its products for specialist duties, *e.g.*, in connexion with real estate, public relations, publicity, and so on. In the post-war period, however, it appeared that the companies were seeking specialists in particular subjects outside the petroleum industry, taking them into the industry, and teaching them about it. Mr Butler agreed with this suggestion which, he said, was partly due to the increased complexity of such specialist work. Those engaged in training, for example, were in an employees' relations or a personnel department. This had led to greater specialization in some subjects and to more professionalization in some others. As a result of that trend, he suggested that standards of performance—both expected and received—had also been going up.

Another speaker noticed the tendency in some industries, *e.g.*, the banks and railways, to recruit staff generally at a young age, with no other qualifications than a fairly high level of school education, and to train them, within the industry, as clerical workers, accountants, engineers, and so on. The oil industry, however, had been expanding so rapidly in recent years that it had been forced to recruit such staff from outside sources. Mr Butler thought that the railways were not, in fact, meeting all their manpower requirements from within the industry. In particular, the expansion due to electrification and dieselization and the technical knowledge related thereto had necessitated recruiting staff from outside the industry. In the petroleum industry he thought that the large companies were aiming to train a lot of their future technologists either by means of university scholarships or by sandwich schemes. They recognized, however, that in doing so they might lose quite a number of such trainees to other industries after they had obtained the requisite qualifications. It was often a question of economics as to whether it was better for the industry to train its employees or leave it to some other body better qualified to do so, and then to recruit the finished products. Moreover, many firms needed all their employees "on the line" and could not spare any of them for specialist training. In that case they had no choice other than to recruit staff from outside the industry. There were signs of this in the Employee Relations Department where, although some salesmen would be welcome for training in personnel management, the needs of the sales side were such that they were finding it difficult to meet this kind of request.

Asked if there were any universities which had special wings for training promising youths in oil technology, Mr Butler said that some universities had departments in chemical engineering with a heavy bias towards oil technology. Another speaker pointed out that both Birmingham University and the Royal School of Mines had departments in general petroleum technology but he enquired whether the oil companies wanted the petroleum technologists or the specialists, *i.e.*, the engineers, the chemists, or the chemical engineers. Mr Butler said that the oil companies tended to recruit men who had received an extensive post-graduate training in petroleum technology and to develop them into specialists, whether it was in research, the sales, or the refining branches.

In the past year or so, he said, a great deal of attention had been paid to specialist training in the form of weekly seminars. These followed up a graduate's initial studies with application to his work as a technologist in refinery processes. There were also indications of conversion courses. These were designed for those companies who had an insufficient supply of good chemical engineers but an ample supply of chemists.

In such cases, some of those chemists who appeared to have a flair for chemical engineering could be sent to a university for a conversion course in order to equip them to undertake chemical engineering work.

It was suggested that specialists were very brainy people and it was asked whether they were the type of individual who would want to rise to one of the several grades of management. Mr Butler replied that in recruiting specialists, whether they were accountants, engineers, architects, or lawyers, one would be likely to look for that somewhat intangible asset—management potential.

Asked what part the psychologist played in the various training schemes, Mr Butler said that, first, the psychologist was the last person who wanted to be known as such, and, secondly, he would only employ his knowledge as a contribution to the day-to-day problems and tasks he was faced with. The psychologist could,

however, play a useful part in the general field of personnel management, especially in regard to the systematic selection of staff. Where a company was operating merit rating schemes or promotion procedures, based on assessing people, the psychologist again had something to contribute by a systematic approach to the subject. He had also something to contribute towards training personnel. Work study was yet another subject where a psychologist could assist engineers engaged on machine design and he could also study work flow from both the human and physical aspects.

Asked what part training could play in the improvement of human relations, which was probably the biggest stumbling block as regards good communication, Mr Butler said that in all aspects of personnel management by communication, for example, it was useless to expect to obtain the impossible from training. Training could contribute only to the improved daily performance of the people doing the job. Moreover, it was necessary for the management to become training-minded, for whatever improvement was made at the foreman level it would be eroded away very quickly by a general apathetic and indifferent management, when a trainee returned to his job. It was probable therefore that not until a training programme permeated the whole organization could an improvement in the training situation not only be recognized but could also have some chance of survival in the daily affairs of the company. Mr Butler agreed that it was very necessary in human relations to know and understand the employee as an individual and to appreciate his temperament, environment, and so on.

Another speaker raised the question of encouraging people to change their jobs between departments for a period. There appeared to be a lot of scope in this connexion both from the administrative and the technical angles, especially for those people who were, more or less, in the same department, and possibly connected one with another, but who were doing rather different work, *e.g.*, in the process and management department of a refinery, or the marine and supply departments of a head office, or between selling gasoline and kerosine. He said there appeared to be much scope there for improving departmental relationships, especially as in some companies there was a feeling that everyone's department, except one's own, was completely chaotic. In supporting that view, Mr Butler said that he wished to combat any impression he might have given that he believed in courses to the exclusion of all other training and of transfer by rotation from one department to another. There were however two ways in which this could be done. Taking the gasoline and kerosine salesmen, for example, both could be transferred from one position to the other and then, possibly, to one in industrial sales, as a process to be followed in preparation for an administrative or management position in sales. This was preferable to just swopping them for experience and then sending them back. It was however necessary to consider carefully the objectives, for if it was inferred that an employee was getting ready for promotion or transfer, and that did not come about, there was likely to be a feeling of frustration or disappointment. He also said that it was necessary to prevent too much changing from one department to another, because the juniors who carried the department while the new boy was learning about it might feel not only very "put out", but that their jobs were training ones and that no one in their department would ever be promoted.

Asked if it was better to select people who were likely to benefit from a training course or to put a lot of people on the course and then select those whom it was considered should have advancement, Mr Butler said that he had not heard of a course being used as a means of assessing people. Promotion was not therefore the outcome of a person's particularly successful performance on a course.

Another speaker asked if it was not the duty of training departments to make an assessment of the people who came up for the course. Was it the practice to get people on the course and leave it to the management to select those whom it considered should be promoted? Mr Butler said that was so, and he would be most reluctant to get into a position where he had to contribute, by some kind of a report on the course, to the selection process. Certain things could, he thought, be fairly and safely assessed on a course but they were very few. Many other things could also be assessed without realizing how dangerous those assessments might be.

That, said a speaker, was the reverse of military training, where a man went on a course, and if he obtained over 60 per cent he was awarded another stripe, but the number who obtained 60 per cent depended on the number of casualties in the previous action.

BP's New Exploration and Production Laboratory at Sunbury

The recent move of The British Petroleum Company's Exploration and Production Research Laboratory from Kirklington Hall to a new specially built laboratory at Sunbury-on-Thames concentrates the great majority of BP research at Sunbury.

The laboratory, the only one of its kind in the Commonwealth, was established at Kirklington Hall in 1947, close to the United Kingdom's only commercial oilfields. It gradually outgrew its accommodation, but in the new building, which has the most modern facilities and equipment for research, there is ample room for expansion. Palaeontological work, formerly done in London, is also carried out in the new laboratory.

Briefly, the functions of the Exploration and Production Laboratory are to examine and develop methods, techniques, instruments, and equipment for:

(1) Exploring and prospecting for oil.

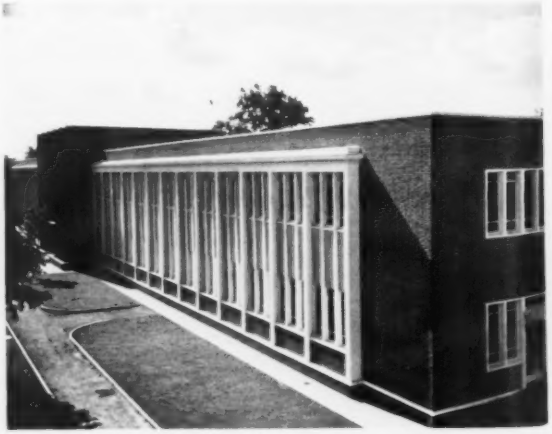
(2) Investigating the characteristics of underground formations with regard to their fluids (oil water) content, and to those properties which determine the ability of the fluids to flow to the well for recovery.

(3) The determination of the physical characteristics underground of the oil when found.

(4) Estimating the extent, probable recoverable reserves, and most economical mode of development and exploitation of an oilfield.

(5) Investigating suitable methods of "secondary recovery" where applicable, and forecasting when such methods should be applied.

(6) Dealing with the economical separation of the high-pressure oil and gas mixture at the well head to produce the maximum quantity of optimum quality stock tank oil suitable for storage and for transport by tank ship or pipeline.



Part of the exterior of the Exploration Research Laboratory

The laboratory is also concerned with assisting field parties in the elucidation of any problems or difficulties beyond the scope of their field facilities. It also provides certain field services in the U.K. to BP Exploration Co. Ltd.

Work in the laboratory is carried out by several sections. One of these is the Geological Research Section, which also embraces geochemistry. Methods and apparatus are employed to study material that cannot be adequately examined in the field. The Section has for instance recently reported on rocks collected during geological exploration in the Canadian Rockies, East Africa, and Papua. The physical nature and chemical composition of sediments from the sea-floor are also determined and compared with rocks encountered during drilling for oil.

In the Palaeontological Section detailed examination is carried out of outcrop samples collected by geologists on survey work in various parts of the world, as well as on samples from information borings and test wells. A thorough search is made of samples for fossils which will give a clue to the age of the rock. Wafer-thin sections of the rock are sliced and examined under the microscope in some cases, while in others the fossils are sometimes separated from the rock merely by washing.

The palaeontological work includes palynology, which is the study of fossil spores and pollen; these samples may sometimes indicate the age of the rock when other fossils are absent.

Research and development into geophysical methods of prospecting for oil and in the instruments required are carried out by another group, the Geophysical Section. Most of the effort of the section is devoted to seismic surveying, as this is claimed to be the most precise method of prospecting.

For this work the Geophysical Section is equipped with field recording apparatus, including magnetic tape recorders and extensive equipment for fully analysing the records obtained.

Many of the section's facilities are employed in devising new or improved instruments and in modifying existing field techniques and instruments to suit the conditions of the areas in which BP is looking for oil. A close liaison is maintained with the Company's operational field surveys to whom advice on their current problems is given when requested.

General view showing the operation of the high-pressure viscometer and pressure balance in the Pressure Volume Temperature Laboratory

In many cases experimental investigations have to be carried out before the best advice can be given.

Extensive testing instruments are available to ensure that the equipment designed for field parties is electrically and mechanically robust enough for the job. The tests that can be made at Sunbury include shaking complete pieces of equipment, freezing them, or subjecting them to high temperatures, and checking how they withstand fungus growth and high humidities.

Research is also being carried out to develop a gravity-measuring instrument which will go down a deep borehole. If and when successfully developed this instrument will extend the range of gravitational observations deep into the earth and provide data which should improve the accuracy of surface gravitational observations.

Measurements on reservoir rocks, oils, and gases, and the predictions of production performance are the responsibilities of the Petroleum Engineering Section.

Samples of reservoir rock are analysed in the core laboratory to determine their pore structure and ability to transmit oil and gas. Oil recovery efficiencies from cores by the now conventional gas injection or water injection methods are measured, and research on cores is directed to new ways of recovering the oil, such as by the injection of solvents or by underground combustion.

Within the section, a Borehole Survey Group, operating in the U.K. and using electrical and radioactive logging equipment, carries out measurements in boreholes of the changes in rock characteristics. The logs are studied in the laboratory and potential oil or gas-bearing zones selected. These zones are then recommended for field production tests.

Another group deals with mud and chemical testing of industrial chemical additives when mixed with typical drilling fluids.

Another group studies the oil-production performance of oilfields and predicts their future potentialities. Field and laboratory data are combined in the study, which involves many numerical calculations and to assist in this work a modern high-speed computer has been installed in the new laboratories.

The logical last step in the research done in the new laboratory at Sunbury is that concerned with production engineering. This section is responsible for the study of separation processes and the design of plant and equipment for achieving separation with maximum economy and efficiency. Research is also carried out into the more fundamental physical properties of gases and crude oil and their individual components, with special reference to underground reservoir conditions.

GAS CHROMATOGRAPHY DISCUSSION GROUP

The inaugural meeting of the Department of Scientific and Industrial Research Gas Chromatography Discussion Group and an informal symposium will be held in the Chemistry Department, University College, Gower Street, London, W.C.1 on 23 September starting at 11 a.m.

The symposium will include contributions from Dr G. A. P. Tuey on liquid phase performance, from Dr I. G. McWilliam on a comparison of detectors, a report on a programme of co-operative analyses of hydrocarbon gases, and proposals for abstracting and collection of data.

Admission is by ticket and application should be made to Dr D. Ambrose, Chemical Research Laboratory, DSIR, Teddington, Middlesex.

The Chemical and Petroleum Engineering Exhibition

A Worth-while Event

The first Chemical and Petroleum Engineering Exhibition, sponsored by the Council of British Manufacturers of Petroleum Equipment and the British Chemical Plant Manufacturers Association and held at Olympia, London, during the period 18–28 June, was an unqualified success.

The leading suppliers of equipment of all types for the specialized and often joint requirements of both industries were there in full. One saw such items as absorbers, blending plant, cargo pumps, derricks, drilling equipment, flow controllers, hoses, paraffin wax plant, pumping installations, tanks, valves of all kinds and sizes, and well-head equipment, to name but a few. As an indication of size range mention might be made of extremes in drilling equipment. This varied from a light-weight aluminium portable rig capable of drilling to about 300 ft to a full-size rotary outfit with a capacity of at least 12,000 ft.

During the Exhibition period the CBMPE held an official luncheon at which members of the Council of The Institute of Petroleum and some overseas visitors were their guests. The chair was taken by G. H. H. Thorne and the main speech was delivered by C. M. Vignoles, C.B.E., President of the IP.

Future Prospects

In the course of his speech, Mr Vignoles said that the rate of growth in oil demand had temporarily slowed down as the result of lessened industrial activity throughout the Western world. There was every reason to believe that this state of affairs would not last long and would soon return to the familiar prospect of having to meet ever-increasing demands for products.

In any case, this interlude had allowed petroleum equipment manufacturers a breathing space in which to catch up with overloaded order books. The oil companies were long-term planners and it could still be confidently forecast that heavy demands would be made on the equipment manufacturers over the next ten years.

Exploration was going forward in more new places than ever before and efforts were continually being made to obtain new areas for exploration.

On the refinery side, expansions in hand and in prospect constituted an even bigger increase in capacity than at any other time in the past ten years, said Mr Vignoles. It was of special significance for British manufacturers that no less than two-thirds of this additional capacity would be in Europe. In the field of petroleum chemicals also, all the big producers, including the oil companies, had plans for great advances in production; and it had recently been predicted that by 1965 the United Kingdom's production of petroleum chemicals would be double what it was last year.

Need for Technical Staff

But, he said, all of this would be of no avail without the necessary intake of young people with qualifications adequate to meet the pressures of an increasingly competitive world. So, said Mr Vignoles, it was all the more encouraging to read that the replies to the questionnaire sent out recently by the Institution of Chemical Engineers to university departments and technical colleges suggested that the supply of new qualified men could be increased by more than three-fold within the next ten years. Nothing less than this would do.

The whole problem of technical education for industry was so vital that its solution could no longer be left to chance. A great deal was being done already but industry must go further and search out opportunities for shrewd investment in the encouragement and education of likely recruits, *before* they have finally decided on their careers. This required the closest co-operation between industrial management, the professional institutes, and educational bodies at all levels.

He had been particularly interested to read recently of two news items about this principle at work in their own industries. One was an account of the first of a series of visits by science and engineering university graduates to the works of an oilfield equipment manufacturer and the other dealt with a three-day residential course for science and mathematics school teachers, organized by an oil company, to show them how the subjects they teach are actually applied in the industry. The aim was to bridge the gap between education and industry, which was still far too wide, and to pool the experience of both sides in working out what could be done in the schools to help equip the student for an industrial career.

The Growth of the Industry

The whole history of the modern oil industry, said Mr Vignoles, had been a kaleidoscope of colourful events, a modern industrial romance that had altered real life for many millions of people. The astonishing thing was that most of it had happened within the normal span of a single human life.

Walking round the Exhibition it was difficult to believe, for instance, that forty-five years ago there were only two manufacturers in England producing oil-well drilling machinery. But most of the development of which the Exhibition was the proof and culmination had taken place since the war.

In 1945 British manufacturers of petroleum equipment resumed their interrupted work in conditions entirely different from those they had known before. The reconversion of British production was hampered by shortage of materials and skilled labour. There was an urgent necessity to catch

up on all the new developments in design which had been going forward in the United States during the war years. The oil companies were anxious to get on with their enormous rehabilitation plans, and the inevitable post-war pressure of demand was intensified by Treasury exchange controls which often put a premium on manufacturers that could be bought for sterling.

The years since 1945, continued Mr Vignoles had seen an unprecedented expansion in the oil business throughout the world. In Britain, and also on the Continent, the oil companies had put through an enormous programme of refinery construction and expansion, as well as fundamental changes in the distribution of products. The search for oil throughout the world had been intensified and the exploration of new areas, including offshore areas, had called for a vast range of specialized equipment, much of it of new design.

The Exhibition was the most conclusive proof of the success with which these difficult challenges had been met and a vivid testimony to the continuing vitality of British engineering as a whole. The post-war period had been an exciting and exhilarating one for British engineering.

The traditional structure of the oil industry was one of large integrated concerns who normally regarded themselves as responsible for almost all the links in the chain of oil operations.

It was therefore significant, he said, that in this field of specialized equipment, where their prosperity depended on having the right tools for the job, they turned to others in whom they had confidence.

Quite apart from the important saving in overheads which the oil industry could thereby make, much of the work of the professional engineer could only be done satisfactorily in an engineering concern itself, where he could apply his whole effort to the ideal and detailed solution of specific problems with an essential eye to manufacturing methods and costs. The work of his counterpart within the oil industry was necessarily different. In the nature of things, he must be first and foremost the servant of a company whose job was not to produce marvels of engineering, but to provide oil products for the market.

This led to a division of function between the two partners. The oil companies, backed by their engineering and research organizations, were experts on what they wanted—or would like to have—in the way of equipment and materials. The manufacturing engineer was the expert on turning those ideas into reality. He thought it was up to the oil industry always to keep in mind that the partnership could not work to the best advantage unless it ensured that the outside designers or manufacturers called upon were provided with quite clear ideas—by way of specifications or service data—of what was needed. British engineers on the manufacturing side were becoming increasingly familiar with the usage of equipment in the oil industry and with the conditions under which it must operate in so many countries overseas.

On the other side of the picture, continued Mr Vignoles, he made no apology for suggesting that because the prosperity of one partner was so closely linked with that of the other, it was as well for designers and manufacturers of petroleum equipment to be constantly cost-conscious in relation to the oil industry as well as their own. It could not be too often repeated that the most serious problem was the massive requirements of capital which must be found if the industry was to keep pace with future demand for its products. The field where the buyer and seller of equipment met was the most crucial one of all in this connexion.

More Details of Exhibits

The following information on exhibits of particular interest to the petroleum industry was received too late for inclusion in the preview published in our June issue.

BABCOCK & WILCOX Ltd, Euston Road, London, N.W.1

Shown for the first time were a production unit of a floating-head type heat exchanger, as used in the power forming processes in the oil industry, and a type CO boiler which utilizes sensible and combustible heat from exhaust gases of a catalytic cracking plant to raise steam.

There were models of the type FH integral furnace boiler, which is available in capacities from 40,000 to 250,000 lb/hour of steam, and the Steambloc packaged boiler which is fully automatic and oil-fired for heavy-duty steam supply or hot-water heating installations.

A photograph showed a possible layout for a nuclear propulsion plant for a tanker and there were examples of the Calorizing process. This process deposits on steel an aluminium-rich layer with an impervious coating of aluminium oxide resistant to oxidation at metal temperatures up to 950° C.

Calmet, a chromium-nickel cast alloy, was shown in the form of tube supports for service in boiler plant, superheaters, etc.

CRANE Ltd, Red Lion Court, London, E.C.4

Of particular interest was a 16-inch cast-alloy 1¼ per cent chromium, ½ per cent molybdenum steel gate valve, fitted with a Stellite-faced Crane flexible wedge disk. It was one of a number being installed at Fawley for hydrogen service at 1040° F.

Also shown were a variety of valves in cast and forged steel, bronze, and cast iron, forged-steel fittings, cast-iron fittings, and malleable iron pipe fittings for a wide range of services, and in certain cases for temperatures up to 1200° F.

DOUGLAS EQUIPMENT Ltd, Tewkesbury Road, Cheltenham

The new 4×4 Pathfinder truck for cross-country duties, oilfield exploration, and desert conditions, and which can carry up to 30 cwt payload, was on the stand. Powered by a Perkins 83 bhp diesel engine, the vehicle has independent front suspension, and is said to be able to climb a gradient of 1 in 2. A petrol-engined version is also available.

The 4×4 6–8 cu. yd dumper is powered by a Rootes Lister 2-stroke diesel engine developing 270 ft-lb torque which through a Douglas transmission provides a tractive effort of 15,560 lb.

The Tugmaster type RH is a new model for handling semi-trailers at terminal points. A special feature is the Douglas hydraulic fifth wheel, which enables the tractor to couple and uncouple at slow speeds, with low tractive effort, and lessened impact shock to tractor and trailer.

ELLIOTT BROTHERS (London) Ltd, London, S.E.13

In a joint exhibit with Fisher Governor Co. Ltd, Rochester, was displayed a range of instrumentation and automatic controls.

The Swartwout electronic system for indicating, recording, and control instruments for continuous processes can be operated from a.c., d.c., or motion inputs.

The Bristol's Metagraphic instruments operate in the standard 3-15 psi signal range and require minimum panel space.

Manufactured in Britain by Elliott Brothers is the dry-bellows differential pressure flowmeter of the Industrial Instrument Corporation of America.

Also shown was the Fisher Wizard controller and the Wizard 2 with a relay and provision for integral operation.

On display for the first time was a blending unit for the in-line blending of intermediate grades of fuel oil, which has been developed in collaboration with the Shell Petroleum Co., and is entirely self-acting.

Other exhibits were the Elliott Drimac force-balance differential pressure transmitter and the Bristol's Dynamaster fast response electronic potentiometer recorder.

FIBREGLASS Ltd, St Helens, Lancashire

Examples were shown of thermal insulation of heating plant and pipes, filtration equipment for air and oil, and corrosion protection of buried pipes.

Fibreglass forms the element of the Multi-Pak air filter, used in laboratories and hospital operating theatres, and glass fibres between 0·0001 and 0·00015 inch diameter are compressed to form the filter cartridge of the Simmonds Coalescer unit which is designed to remove water from oil and kerosine.

The firm's reinforced Pipewrap, formed of a thin tissue of randomly distributed glass fibres longitudinally reinforced with continuous filament glass yarns, when embedded in the hot applied enamel on a pipe gives increased tensile strength as well as corrosion protection.

HILMOR Ltd, Stevenage, Herts

On display were hand-operated, hydraulic, and motorized tube-bending machines. They can be used with mild and stainless-steel tubes and all types of non-ferrous tubes, angles, tees, and extrusions.

Samples were shown of bends, produced cold and unfilled, in ferrous tubes up to 4½ inches outside diameter and in non-ferrous tubes up to 6 inches bore in square, rectangular, and oval section, and in finned copper and steel tube.

HINDLE, JOSHUA & SONS Ltd, Leeds, 1

Centre-piece on the stand was what is claimed to be the largest gate valve made in Britain. It was a 24-inch stainless-steel split wedge gate valve with flanged ends, standing nearly 10 ft high and weighing over 1 ton.

Hindle stainless-steel gate, globe, flush outlet, oblique, check, steam-jacketted, pressure-relief, float, and needle control valves were also shown. There were also liquid level gauges, strainers, sight-flow instruments, cocks, special valves, and pipe fittings.

Manufactured in Britain under licence are the Hindle-Hamer line blind valves, plug, and visible wedge valves up to 16-inch bore, and a new leak-proof gate valve.

KLINGER, RICHARD Ltd, Sidcup, Kent

On view for the first time was the Klingermatic electro-hydraulic power package unit for remote operation of valves, at any distance from the control point. It operates Klingermatic piston valves of from 2½ to 8 inches and may also be used for other suitable valves. The unit is self-contained and has a rating of 1 kW at 220 V single phase or 400 V 3 phase.

Speeds of opening and closing can be controlled independently. The minimum time for one stroke of an 8-inch double-beat valve is 10 sec, and 11 sec for a 6-inch valve. Maximum stroke is about 5 inches.

METAL CONTAINERS Ltd, Waterloo Place, London, S.W.1

Amongst the range of steel drums displayed was the new Valethene 45-gal drum designed for handling and transport of corrosive and sensitive liquids. The drum, which is of steel, has a semi-rigid polyethylene inner container and is claimed to combine the strength, endurance, and safe handling of steel drums with the high chemical resistance and inert properties of polyethylene. Total weight of the drum is 62 lb.

Also shown were the new Tri-Sure lacquered bungs and flanges, and internal-coated drums for packing dyestuffs, technical oils, and pigments.

MOND NICKEL Co. Ltd, Millbank, London, S.W.1

Exhibits were divided into six sections. The first two dealt with wet and dry corrosion and covered selection of materials, methods of testing, laboratory facilities, and examples of failure and successes.

The other sections were concerned with metallic and saline catalysts, metal finishing, welding, and the mechanical properties of materials produced by the Company.

NEWALLS INSULATION Co. Ltd, Washington, Co. Durham

An illuminated display drew attention to insulation products for the temperature range — 300 F to over 2000 F, and included the latest product, Newtherm calcium silicate insulation. This is specially suitable for refineries and chemical plant. Also on display were insulated pipes and high-temperature insulating bricks for boiler furnace walls and floor construction. Acoustic insulation was covered by a display of Paxtiles.

PERKINS, F. Ltd, Peterborough

Two industrial versions of the new 1·6 litre Four 99 diesel engine were on show. One was bearer mounted for fork-lift trucks, industrial tractors, and mobile cranes, and produces 35 bhp. The other was pedestal mounted with a continuous maximum rating of 32 bhp.

Other engines shown had ratings from 15·75 to 83 bhp. Models are available up to 125 bhp for industrial purposes. Features include press button cold starting, compactness, and moderate fuel consumption.

ROLLS-ROYCE Ltd, Oil Engine Division, Shrewsbury

Claimed to represent a substantial advance in light-weight high output diesels, and shown to the public for the first time, was the twin eight pack with torque converter for oilfield use. It develops 362 bhp at maximum heavy-duty rating or 465 bhp for intermittent use.

Also shown for the first time was the 124 bhp engine which is to be used to power the British-built International Harvester BTD 20 crawler tractor.

The Rolls-Royce range of diesel engines covers power outputs from 60 to 600 bhp, with 4, 6, or 8 cylinders, unsupercharged, supercharged, or turbocharged. All units incorporate interchangeable parts.

The engines are currently being applied to Consolidated Pneumatic compressors, the Euclid 22-ton rear dumper, the Vickers Vigor crawler tractor, and National OWECO slush pumps, drilling rigs, and drill works.

WIGGIN, HENRY & Co. Ltd, Millbank, London, S.W.1

Amongst the exhibits were a section of a Glitsch tray of Corronel B, a nickel-molybdenum-iron alloy with high resistance to hydrochloric, phosphoric, and sulphuric acids, a nickel-clad heat exchanger tube plate of 1-inch thick Colclad steel, and a section of a distillation column fabricated in ⅜-inch Monel plate.

A flame-trap of Ni-o-nel, a nickel-chromium-molybdenum-iron alloy, illustrated the type of construction that calls for strip and tape, and an example of extruded material was a hydrocarbon cracker tube of extruded Incoloy pipe. Incoloy is a nickel-chromium-iron alloy suitable for high temperature use.

An example of the use of forging was provided by a Nimonic 75 pouring lip from a sodium silicate furnace, which had been in continuous contact with molten silicate at 900–1000 C.

Also shown were castings in Monel.

MIDDLE EAST OIL PRODUCTION

	May	*Jan.–May*
	Tons	
Iraq Petroleum Co. Ltd ...	1,894,861	7,978,744
Basrah Petroleum Co. Ltd ...	887,537	4,296,177
Mosul Petroleum Co. Ltd ...	103,196	530,558
Qatar Petroleum Co. Ltd ...	684,766	3,334,045
Iraanse Aardolie Exploratie en Productie Mij	3,068,000	16,207,000
Kuwait Oil Co. Ltd	5,727,691	27,816,218
	Barrels	
Arabian American Oil Co. (Saudi Arabia)	30,365,316	150,888,475
Bahrain Petroleum Co. Ltd. ...	1,247,386	6,680,362

The refinery throughput at Abadan of the Iraanse Aardolie Raffinage Mij for May was 1,157,000 tons, the total for 1 January to 31 May being 6,297,000 tons.

Crude processed at Aramco's Ras Tanura refinery during May amounted to 5,209,466 brl, the total for 1 January to 31 May being 27,862,776 brl.

Oil deliveries from Sidon, Lebanon, by Trans-Arabian Pipe Line Co. in May were 11,174,957 brl, the total for 1 January to 31 May being 53,155,833 brl.

CATALYTIC REFORMER ON STREAM AT ANTWERP

A new 10,000 b.d. catalytic reformer has recently been brought on stream at Antwerp refinery, which is jointly owned by BP and Petrofina. It is one of four similar units being installed in the BP Group's refineries. Two are nearly completed, one at Dunkirk and the other at Kent refinery, and a third, due to be commissioned by the end of this year, is under construction at Kwinana refinery, Western Australia.

Around the Branches

BAHRAIN, ESSEX, FAWLEY, KUWAIT, LONDON, NORTHERN, SCOTTISH, SOUTH-EASTERN, SOUTH WALES, STANLOW, TRINIDAD

Members of the London Branch at Fawley refinery

London Branch Summer Outing

A goodly number of London Branch members set out from London on 30 May, their destination being the Fawley refinery of Esso Petroleum Company Ltd. The first leg of the journey was by train and started in typical English summer weather—cloud and drizzle of rain. However, by the time Southampton was reached the sun had decided to shine and continued to do so for the rest of the day. The journey from Southampton to Fawley was made by coach and at the refinery the party was greeted by Dr F. Mayo, the refinery manager. Following an interesting and very informative talk by C. R. Young on the operation of the refinery, lunch was served and then the refinery was toured in two parties, one under the guidance of Mr Young and the other led by C. L. Southall.

Since 1952, when the London Branch last visited Fawley, many additional plants have been constructed and were in operation. New chemical plants were also in the course of construction and all provided evidence of the increased needs of petroleum products and the growth of the petroleum industry in the United Kingdom.

At a suitable opportunity, J. C. Jewell, Branch chairman, expressed the thanks of all present to the Company for the facilities provided for the visit, and to those who had given so much of their time to show them around.

The Institute of Petroleum Yorkshire Branch

Arrangements have been made for the formation of a new branch of the Institute to serve those members living in the County of Yorkshire. The name of the new branch is the Yorkshire Branch and the headquarters will be in Leeds. A tentative committee has been set up and is making arrangements for the first annual general meeting to be held early in January next. The constitution of the tentative committee is:—

Chairman:	G. J. Vineall
Hon. secretary:	A. Furness
Hon. treasurer:	R. G. Prophet
	F. Cropper
	P. Gledhill
	G. E. Gray
	H. Wells

Members of the Institute residing in Yorkshire and wishing to join the new Branch should communicate with A. Furness, c/o J. W. Miller & Son Ltd, Hillside Oil Works, Brighouse, Yorks.

Nuclear Research in Petroleum

The latest research in the application of atomic energy to the petroleum industry will be presented at the 1958 International Conference on the Peaceful Uses of Atomic Energy to be held in Geneva, 1–13 September.

The Document Service of The Chronicle of United Nations Activities has inaugurated a complete service to supply the petroleum industry with materials of the conference. Available immediately are the lists of papers to be presented, which include several hundred on petroleum research.

Topics covered include technical and economic aspects of nuclear power plants; the use of nuclear power for marine propulsion; new information on fuel cycles with emphasis on operational problems and economic implications; and the geology of raw material supplies, with special emphasis on new methods and instruments for prospecting and exploration.

These lists may be obtained free from Petroleum Document Service, The Chronicle of United Nations Activities, 234 West 26th Street, New York 1, New York.

Personal Notes

For public services in Australia, **D. W. Brisbane,** chairman of BP refinery (Kwinana) Ltd, was awarded the C.B.E. in Her Majesty's Birthday Honours List.

Admiral of the Fleet **Sir John Henry Dacres Cunningham,** G.C.B., M.V.O., M.I.I.E. (Hon.), who has been chairman of the Iraq Petroleum Company and Associated Companies since 1 October 1949, retired on 30 June.

In 1914 Sir John first came into contact with the oil industry during the troubled times in Mexico, when the responsibility for the defence of Mexican Eagle's refinery at Minatitlan fell to the ship in which he was serving.

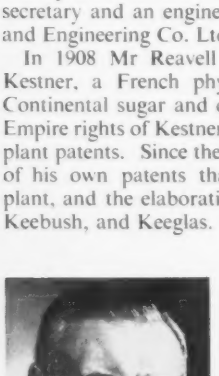
Sir John became familiar, as lecturer on logistics at the Senior Officers' War Course at Greenwich from 1924 to 1927, with the problems of the supply and distribution in peace and war of oil products for the fleet. As director of plans, 1930–1932, he was acquainted with other aspects of the oil industry through contacts with the major producing companies.

Later, as chief of supplies and transport at the Admiralty, 1941–1943, he was a member of the Anglo-American Oil Control Board, and was responsible for ensuring for the navy adequate supplies of fuel.

Sir John was appointed Commander-in-Chief Levant in 1943, and from 1943 to 1946 was C. in C. Mediterranean and Allied Naval Commander, Mediterranean. From 1946 to 1948 he was First Sea Lord and Chief of Naval Staff.

This year 86-year-old **J. Arthur Reavell,** M.I.Mech.E., M.I.Chem.E., F.Inst.F., F.I.M., celebrates his fiftieth anniversary as chairman of the Company he founded, with a secretary and an engineer, in 1908, the Kestner Evaporator and Engineering Co. Ltd.

In 1908 Mr Reavell embraced the proposition of Paul Kestner, a French physicist with close associations with Continental sugar and chemical industries, to take over the Empire rights of Kestner's climbing film evaporator and other plant patents. Since then Mr Reavell has added a long string of his own patents that deal with evaporators, chemical plant, and the elaboration of materials, such as silicon iron, Keebush, and Keeglas.



C. E. Spearing

Colin E. Spearing has been elected to the board of the Kellogg International Corporation, and will establish a permanent office at Kellogg House, London.

Mr Liebrecht, president of Kellogg International, said, "As a director of K.I.C. Mr Spearing brings to us a life-time of experience in planning, building, and operating oil refineries in Great Britain, Europe, Near East, and other areas. Mr Spearing will work on special projects to broaden the fields of activity of K.I.C."

On 8 June **Sir Leonard Sinclair,** chairman of Esso Petroleum Co. Ltd since 1951, completed 50 years' continuous service.

An Esso photograph

Sir Leonard Sinclair

Sir Leonard joined the Anglo-American Oil Co. (as Esso was then known) as a junior clerk in Manchester in 1908 on the day before his thirteenth birthday, at a monthly salary of £1 10s. 4d.

During the first world war he served with the Royal Welsh Fusiliers, the Cheshire Regiment, and Machine Gun Corps. He rejoined the Company on demobilization and was subsequently appointed a sales representative in 1922 at the Manchester branch. In 1927 he was promoted to assistant manager of the Birmingham branch. He was successively branch manager at Preston, divisional manager of the south-western division at Bristol, and in 1933 he was appointed assistant general sales manager at head office, London.

During world war II Sir Leonard was a director of the Petroleum Board and in 1943 he was appointed a director of Esso. Six years later he became a managing director.

Sir Leonard was created a Knight Bachelor in the New Year Honours list in 1955.

A. Hittinger, who joined the National Benzole Co. Ltd in 1919, shortly after the formation of the Company, has resigned from the board of Benzole Producers Ltd.

He became secretary of the National Benzole Co. Ltd in 1920 and general manager in 1926. In 1934 he was elected to the board and became managing director in 1938. In 1941 he was appointed deputy chairman of National Benzole and in 1948 he became chairman, a post he held until 1955.

From the formation of Benzole Producers Ltd in 1953 he was chairman of the Company for two years, until he relinquished the position but remained a director.

During the war years Mr Hittinger was a director of the Petroleum Board, deputy chairman of the Management Committee, and chairman of the Finance Committee.

T. H. Howgill has been appointed an additional assistant divisional manager, National Benzole Co. Ltd, London division, from 16 June. Mr Howgill was previously with Shell-Mex and B.P. Ltd.

R. Bartle has been appointed assistant manager, pump department, from 1 June.

F. G. Brewer, O.B.E., who has been secretary to the Gas Council since its formation in 1948, is to retire from office at the end of September.

The chief accountant of the Council, **Wilfrid Bailey,** F.S.A.A., F.I.M.T.A., has been appointed to succeed Mr Brewer.

Gordon W. **Duncan,** assistant director, technical information division, Esso Research and Engineering Co., has accepted an appointment for one year from 12 June as assistant general secretary of the Fifth World Petroleum Congress to be held next year at New York. He is a graduate of Pennsylvania State University and has been with Esso Research and Engineering for 21 years.

P. H. Dunn, M.A., who, for the past 4 years, has been the Babcock & Wilcox Ltd representative in New York, has returned to the Company's head office in London to take up the appointment of assistant sales manager.

T. S. Blackadder has been appointed representative of the Company in New York.

At the recent Annual Meeting, **W. A. Hubbard,** M.Inst.F., M.Inst.Pet., was elected president of the British Oil Burner Manufacturers Association Ltd. This is Mr Hubbard's second term of office as he was president in 1938–44 and honorary secretary in 1933–38.

Fahmi N. Dahdah, a Jordanian who recently joined Tretolite Company division of Petrolite Corporation, St Louis, Missouri, has been appointed representative for the Tretolite Company in the Middle East oil-producing countries. He will serve as engineer on the Company's overseas staff and his headquarters will be at Al Kuwait.

David F. Craig has been appointed to the board of Liquid Systems Ltd, Wellesley Road, Croydon.

H. W. Boyne has joined Colloidal Graphite Ltd, of London and Sheffield as technical sales representative. He was previously home sales manager of Arthur Balfour & Co. Ltd.

J. L. Ritchie, B.Sc., M.I.Mech.E., has been appointed personal assistant to the managing director of the Consolidated Pneumatic Tool Co. Ltd, from 1 July. This is an entirely new appointment in the Company. Mr Ritchie has left the board of Aveling Barford Ltd, a company with which he has been associated for nearly 25 years.

Bruce C. Clinesmith has been appointed deputy comptroller of Standard Oil Company (New Jersey), after being assistant comptroller for the past year.

He began his career with the Jersey organization in 1938 when he joined the Carter Oil Co. Eight years later he was transferred to Jersey's New York headquarters where he became successively head of the producing accounting co-ordination division, administrative assistant, special assistant to the deputy comptroller, and assistant comptroller.

Mr Clinesmith is a graduate of Oklahoma State University and a member of the American Petroleum Institute.

The death is reported of **G. A. S. Harvey,** president of G. A. Harvey & Co. Ltd, Greenwich, London, S.E.7, on 28 May. Mr Harvey had served the Company throughout his working life and was chairman and managing director from 1937 until his retirement from active participation in the Company's business in 1956.

Mobil Oil Company Honours Sir Alexander McColl

On 10 June Sir Alexander McColl was entertained at luncheon by J. C. Gridley, chairman of Mobil Oil Co., and his fellow directors. The occasion marked the eightieth birthday of Sir Alexander, who has had a long and distinguished life in the world of commerce, particularly in the British petroleum industry.

Born in Kilmarnock, Sir Alexander spent the first 13 years of his career in the Glasgow and South Western Railway's locomotive department. He then joined Vacuum Oil Co. in London, with special responsibilities for the sale of petroleum products to the railway companies. In 1912 he became sales manager of Vacuum and during the first world war served on the Lubricating Oil Committee. In 1919 he became a director of the Company, in 1932 deputy chairman, and in 1936 chairman.

Outstanding in his career were the invaluable services he gave to the Government in the second world war—services which were rewarded by a knighthood in 1946. Before the war he had been appointed chairman of the Lubricating Oil Committee, which had as its terms of reference the drawing-up of plans to control the U.K. petroleum industry in the event of war. After the outbreak of war, Sir Alexander was appointed a member of the four-man Control Committee of the Petroleum Board, the other members being Lords Strathalmond and Godber and Sir H. Heath Eves.

Although devoting most of his career to the petroleum industry, Sir Alexander McColl's wide business experience is illustrated by his connexions in other spheres. He is chairman of The Superheater Co. Ltd and of Alley and Maclellans Ltd of Worcester—both manufacturers of equipment for the oil industry; he is also a director of Alley and Maclellan (Polmadie) Ltd and of Glenfield and Kennedy (Holdings) Ltd of Kilmarnock.

Sir Alexander is head of the Clan McColl, past-president of the London Ayrshire Society, and vice-president of the Scottish Council (Development in Industry), in which capacity he has been closely connected with the establishment of 150,000 new jobs in Scottish industry.

Sir Alexander McColl (centre) *reading one of the many telegrams of congratulation on his 80th birthday. On the right is J. C. Gridley, chairman, and on the left H. W. Rocke, managing director of Mobil Oil Co. Ltd*

New Books

U.D.C. Trilingual Abridged Edition

A trilingual abridged edition of a book dealing with the universal decimal classification system for cataloguing library books has been published in Britain by the British Standards Institution and in Germany by Beuth-Vertrieb G.m.B.H., Berlin.

The new edition, which is in English, French, and German, is intended primarily for classifiers in all branches of documentation, library, and information work, and its outline of UDC schedules corresponds closely to BS 1000A and other national abridged editions.

It is the result of collaboration, within the framework of the Fédération Internationale de Documentation, by editors, committees, and specialists of the BSI, Deutscher Normenausschuss, Association Belge de Documentation, and Union Française des Organismes de Documentation.

The price of the book is £6 6*s*. and copies may be obtained from BSI, Sales Branch, 2 Park Street, London, W.1.

Our National Heritage

Poetry and pictures combine to emphasize the richness and variety of Britain's beautiful landscape and noble buildings in the latest volume of *Our National Heritage*, published by the National Benzole Co. Ltd.

Extracts from the works of thirty-six poets, from Chaucer to Dylan Thomas, provide the text, which is illustrated with photographs and supplemented by thumb-nail sketches of the exact locations of the scenes shown.

This is the fifth book in the series; the previous four have been published as a single volume by Phoenix House at the price of 12*s*. 6*d*., and copies are obtainable from booksellers.

The National Benzole Company have also introduced a series of 5-miles-to-the-inch road maps that cover the whole of England, Wales, and Scotland in four sections. A fifth section is devoted to central London. The price of these maps is 1*s*. each and copies can be obtained from all National Benzole filling stations.

Paramins Handbook

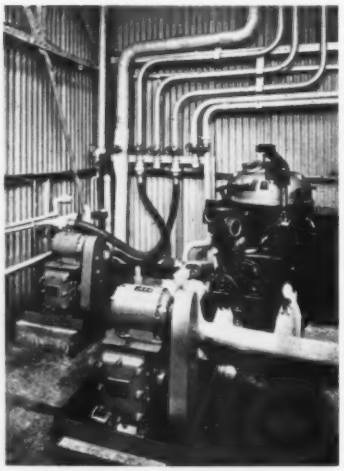
In the compilation of a new handbook on Paramins, the oil additives developed by Esso Research and Engineering Co. in the U.S.A. and Esso Research Ltd in Britain, great care has been taken to avoid the production of just another catalogue. The aim has been to provide a brief factual explanation of the functions of the present-day oil additives, and recommendations on their use, in addition to a description of the characteristics and applications of the Company's own products.

The handbook, which is durably bound in plastic covers, is of the loose-leaf type so that any of the sections may be brought up-to-date, if needed, by the introduction of new material. The sections deal respectively with detergent-inhibitors, viscosity index improvers, pour point depressants, gear oil additives, industrial oil improvers, and miscellaneous additives. Each section opens with a summary of the problems which the additives have been developed to solve, together with the way in which they operate. This is followed by data sheets listing the type, applications, properties, and performance of relevant Paramins.

Copies of the handbook may be obtained from Esso Petroleum Co. Ltd, Wholesale Department, 15–17 Suffolk Street, London, S.W. 1.

Trade Literature, etc.

Megator Pumps at Sunbury Research Station



At BP's Sunbury Research Station some 1200 technicians and other skilled staff are employed on research and testing of different fuels, lubricating oils, and other refinery products. Their experiments require pumps that can handle from a few pints to several thousand gallons, that can deal with a variety of fuels in quick succession, and that can be easily cleaned. The type chosen to fulfil all these requirements was the Megator M16 sliding-shoe pump, tw of which are shown installed in the Fuel Treatment House of the Applications Research Section, which deals with the practical testing of fuels and lubricants for aviation, marine, industrial, and automotive engines.

Each pump is driven by its own 2 hp electric motor and is ratec to deliver 15 gpm at 100 psi. Fuels handled vary from gas oil wit a viscosity of only 35 seconds Redwood No. 1 to bunker C marin fuels with a viscosity that can be as high as 3000 seconds at 180° F. The pumps were supplied by the makers, Megator Pumps and Compressors Ltd, 43 Berkeley Square, London, W.1.

New Booklet on Udex Process

A new booklet gives data on UOP's Udex process for solvent extraction of benzene, toluene, and xylenes from refinery streams or coke-oven light oil.

Statistics are included of aromatics production trends, yields, estimated chemical and utility requirements, and operating costs estimates.

Copies can be obtained from Universal Oil Products Co., 30 Algonquin Road, Des Plaines, Illinois, U.S.A.

Marine and Diesel Fuel Oil Additives

Two new additives have been developed by The Amber Chemical Co. Ltd, 11A Albemarle Street, London, W.1, for use with marine and diesel fuel oils.

Small amounts of Amber SSR 511 added to fuel oils are claimed to reduce sludge formation to a harmless level during normal storage periods. The treatment is said to be particularly effective in improving the stability of fuel oils made up of straight-run distillates and components produced in catalytic cracking units. The treatment costs approximately 0·06*d* per gallon of oil consumed.

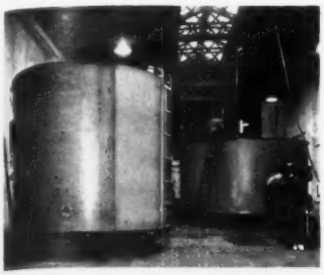
Amber SSR 513, added to diesel fuels, is claimed to soften and break up the binders in carbon and to lower its ignition point. The engine compression ratio is thus maintained and unburnt fuel and combustion products are not carried past the piston to contaminate oil in the sump. The additive may also be used with boiler oil, and its cost is claimed to be about 0·13*d* per gallon of diesel fuel consumed.

Brochure on SBA-Kellogg Acetylene Processes

A new six-page brochure describes in some detail the SBA-Kellogg acetylene processes, originally developed by Société de l'Azote (SBA) of Belgium. The booklet includes a general flowsheet, information on operating costs for four cases with natural gas and naphtha as feeds, and data on the recovery system and feedstocks.

Copies can be obtained from The M. W. Kellogg Co., 711 Third Avenue, New York 17, New York.

Mild-steel Tanks to API Specifications



Bates & Bates Ltd, Liverpool 19, a subsidiary of Francis Morton & Co. Ltd, are producing a range of bolted steel tanks to oilfield requirements. These tanks are manufactured in accordance with specification 12–B of the API, so that bottoms, staves, and decks are interchangeable with those of any other manufacturer to API specification. Standard sizes range from a capacity of 1760 to 177,000 gallons. The firm also supply standard steel tanks for on-site welding. These are also to API specifications.

The illustration shows bolted steel tanks in the shop trial erection stage. These tanks were purchased by a major oil company and that in the foreground has a capacity of 100 brl. Further back appears a 250-brl tank.

Marshall Organization House Magazine

The latest issue of *Mettle*, the house magazine of the Marshall organization, covers the past six months and reflects the varied interests of the Group.

A leading article records the production of a new type of diesel shunting locomotive by John Fowler & Co. Ltd, of Leeds, a member company of the Group. Other features deal with Fowler tractors at work in Queensland, Marshall and Fowler equipment muck-shifting in Buckinghamshire, tractor selling to the Chinese, and the manufacture of 169-strand conductors for the electricity grid's crossing of the River Severn.

U.S. Oil Refining Unit on Show at Brussels

Amongst the exhibits in the U.S. Pavilion at the Brussels International Fair is a full-coloured scale model of a catalytic reforming unit that is currently producing high-octane gasoline components in an Illinois refinery.

The model, which shows all of the detailed engineering and the equipment actually used to reform petroleum components, was constructed as an engineering design tool and later used as a construction and operator training aid at the site where the unit was being built.

All piping, valves, pumps, compressors, etc., are of preformed plastic construction which can be assembled without glue. Only equipment such as towers and furnaces need to be specially fabricated. By the use of such prefabricated parts Kellogg have been able to evolve a technique whereby the planning and layout design of processes and plants can be entirely accomplished with models, which virtually eliminates the usual drawings.

Segas Plant for Northern Gas Board

An order has been received by the gas plant division of The Power-Gas Corporation, Stockton-on-Tees, from the Northern Gas Board for a 2 million cu. ft/day Segas catalytic oil gas process plant. The plant, to be installed at Darlington, is planned for completion by August 1959.

This is the seventh contract for Segas plant gained in Britain and a number of similar units are installed or under construction in Germany, Italy, Malta, Hong Kong, and Scandinavia.

In Italy an extension of a third unit of high Btu oil-gas plant is to be installed. Some of the equipment will be manufactured locally, but the PGC hydraulic control system with valves will be supplied from Britain.

New Catalytic Reforming Unit on Stream in Belgium

A new Kellogg catalytic reforming unit with desulphurization facilities has been placed on stream by Raffinerie Belge de Petroles, SA, Antwerp. The reforming unit uses the Sinclair-Baker-Kellogg RD 150 catalyst and will reform 2500 b.d. of Iraq heavy straight-run naphtha into an 88 F-1 clear octane reformate. The desulphurizer uses cobalt molybdate catalyst and handles the total 4600 b.d. fresh naphtha feed to the unit.

Reinforced Plastics for Corrosive Liquors

The Kestner Evaporator and Engineering Co. Ltd, 5 Grosvenor Gardens, London, S.W.1, have introduced a range of glass-fibre reinforced plastics of enhanced mechanical strength. The range, which is known as Keeglas, is described in a preliminary brochure recently issued.

The new plastic has been used for the supporting frame of a 250-gallon cylindrical vessel to contain mercuric chloride, which means that the frame is as inert to corrosive attack as the vessel itself, thus overcoming problems caused by spillage, dripping, etc.

Keeglas is available in two standard grades, both suitable for working temperatures up to 100° C, but alternative grades can be supplied for special duties. Pipes, tanks, and reaction vessels are already being fabricated from this material and further details are obtainable from the manufacturers.

Kellogg Contract for Venezuelan Refinery

The M. W. Kellogg Company, New York, and its subsidiary, Compania Kellogg de Venezuela, Caracas, have been awarded contracts for the design engineering, procurement, and construction of the new Socony Mobil Oil Company de Venezuela refinery at El Palito.

The process facilities of the plant will consist of a 40,000 b.d. single stage atmospheric distillation unit, including gasoline fractionation and stabilization, a 6000 b.d. catalytic reforming unit, and a caustic treating unit. The offsite facilities will include light oil and TEL blending, water-treating and disposal systems, utility systems, refinery tankage, and other facilities. The products of the refinery, which will operate on Barinas crude, will be gasolines, kerosine, jet fuel, middle distillate, and heavy fuels. The refinery is expected to go on stream in the latter part of 1959. In the designing of the refinery, Kellogg will make extensive use of the company's new model-making technique.

New Gas Refrigerating Machine

An addition to the range of Philips gas refrigerating machines is announced by their sole distributors, Research and Control Instruments Ltd, 207 Kings Cross Road, London, W.C.1.

The new machine incorporates a nitrogen separation column by which air can be liquefied and separated at atmospheric pressure to produce 4 litres of liquid nitrogen per hour. Continuous operation is possible for one week before defrosting is needed.

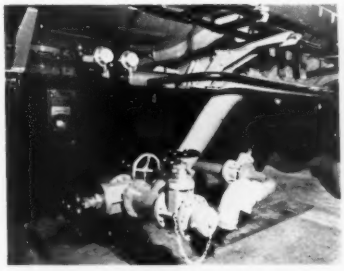
The machine is fully automatic, has small dimensions compared with conventional equipment, and there is negligible risk of contamination because the air is cooled at atmospheric pressure in a single stage and does not pass through any moving parts.

Whessoe Review

The latest edition of *Whessoe Review* contains an article on organic sulphur removal from town gas and a feature on the Whessoe tanks supplied for the Shell-Mex and B.P. new distribution scheme in the U.K.

Copies may be obtained from Whessoe Ltd, 25 Victoria Street, London, S.W.1.

2000-gallon All-products Road Tanker



Recent construction at the Beaumaris works of Saunders-Roe (Anglesey) Ltd has included a 2000-gallon all-products road tanker which is one of a number of varying capacities being built for Shell-Mex and B.P. Ltd.

The tank, which is 17 ft long, is of all-welded construction in 12 gauge steel and is elliptical in cross-section. It is divided into four separate Epikote-lined compartments.

The AEC Mercury chassis on which the tank is mounted has a power take-off drive from the gearbox for a Stothert & Pitt pump, which is reversible and enables self-loading to be obtained. The pumping system is arranged by manifold connexion to permit either gravity or pressurized delivery.

Forthcoming Meeting

THE INSTITUTE

(At 61 New Cavendish Street, London, W.1, 5.30 p.m.—tea 5 p.m.)

Harmful Effects of Electrostatic Charges on Machinery and Lubricating Oils. Dr T. Salomon. **17 September**

New Fire-fighting Equipment

Two new items of fire-fighting equipment, manufactured by Foamite Ltd, 235–241 Regent Street, London, W.1, are a 150-lb. dry chemical fire extinguisher and a refinery airfoam lorry.

The first, which consists of a light-steel spherical container for powder and a standard CO_2 extinguisher mounted on a rubber-tyred chassis, is easily wheeled by one man and can discharge 150 lb. of powder in one minute through a pistol-grip non-recoil nozzle. The 30-ft hose is specially mounted for instant removal without kinking.

The second is a self-propelled appliance consisting of a 750 gpm Dennis centrifugal pump mounted on a Dennis chassis. This feeds an Airfoam liquid proportioning pump from a 625-gallon Airfoam liquid tank. The pressure foam makers comprise two model 30 and a single model 15.

Progressive and Growing

AMERICAN-DUTCH COMPANY

engaged in design and construction of petroleum refineries and chemical plants requires

ENGINEERING SALES EXECUTIVE

with first-class educational background, convincing manner, ability to inspire confidence, fluent French or German.

If you have capacity to speak and write effectively and if you are interested in applying your talents in dealing with top-level executives in large oil and chemical companies, then we invite you to write us, giving a résumé of your education and experience. Your reply will be held in strict confidence.

This position requires that you be free to travel abroad. It offers opportunities for advancement into management position with good starting salary.

Applicant must have had process engineering sales experience in petroleum refining or chemical industries.

Badger N.
Comprimo V.

Mauritskade 39, The Hague, Holland.
Attention: General Manager.

Small Bottle Cleaning Machine

Recently added to their range of bottle-washing machines by Bratby & Hinchliffe Ltd, Gorton Lane, Manchester 18, is a smaller model particularly suitable for washing oil bottles, laboratory samples, cans, jars, and the like.

The new machine, known as the Hydromina, is a self-contained unit incorporating its own pump and drive motor and requires less than 30 sq. ft of floor space. The rotating pawl and ratchet mechanism which operates the bottle carrier assembly is designed to give the maximum time as a stationary pause over the jets. This almost doubles the time given to internal washing of the bottles, as compared with the more common crank type of intermittent motion of the carrier. All normal bottles in the range 4 to 40 oz, with heights up to 14 inches, and diameters up to 4 inches, may be handled. Up to 120 dozen bottles per hour may be cleaned on the standard model.

Full details of the Hydromina are contained in a leaflet obtainable from the manufacturers.

British Diesel Engines to be Made in Spain

Perkins diesel engines are to be made in Spain under licence by Perkins Hispania SA, a newly-formed Company, at Carretera de Aragon on the outskirts of Madrid. The manufacturing contract has been approved, subject to certain provisions, by the Ministry of Industry, Madrid.

President of the Spanish Company is Don Antonio Torres Espinosa, who is also president of the Spanish Government's Rio Tinto Mines. Capital of the new Company is 80 million pesetas, about £750,000.

Cathodic Protection of Ships' Hulls

A new method of cathodic protection for ships' hulls has been designed by Cathodic Corrosion Control Ltd, a subsidiary of Constructors John Brown Ltd. Their standard CX 3 line anode has been incorporated into an automatically controlled cathodic protection system, which has been approved by Lloyds Register of Shipping.

The new system, which operates on a.c., is simple to install and the current supplied to the anodes is automatically regulated to within 10 mV of the preset potential setting.

Amongst advantages claimed for the system are extension of the periods between dry-docking up to at least one year and hull life becomes a matter of obsolescence rather than the necessity for extensive repairs.

FOR SALE

For sale—five new 10,000-barrel capacity bolted bulk storage tanks by Columbian Steel Tank Co. 55 ft dia. × 24 ft high, suitable for all petroleum products. In original sea-worthy packing. Reed Bros (Engineering) Ltd, Replant Works, Woolwich Industrial Estate, Woolwich, S.E.18.

SITUATION VACANT

The services of an **Assistant Engineer** are required in connexion with Oil Refinery Maintenance. His immediate duties will relate to inspection and preventive maintenance; applicants should therefore have had experience of this work in chemical works or refineries. The commencing salary will be £1000 to £1250, depending upon experience and qualifications. The successful applicant must be a corporate member of a professional engineering institution. Applications should be addressed to the refinery manager, Lobitos Oilfields Limited, Ellesmere Port, Cheshire.

SITUATION WANTED

Petroleum Engineer. Graduate petroleum engineer, six years' experience in overseas oilfields, principally in drilling and production phases, seeks employment of any type, preferably in this country. Box No. 1122, *IP Review*.

The proprietor of British Patent Specification No. 729,278 for "Improvements in Well Swabs" desires to grant manufacturing licences or to make other arrangements on reasonable terms, for the purpose of working the invention in this country. For further particulars apply in the first instance to Mathys & Squire, 52 Chancery Lane, London, W.C.2.

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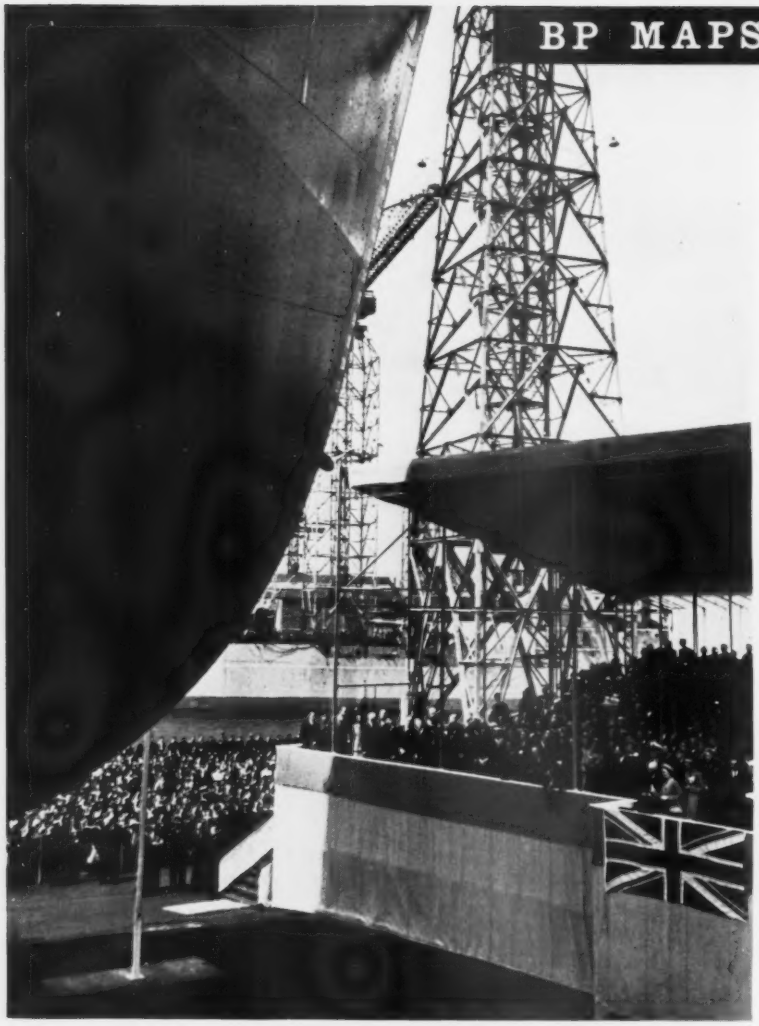
High grade fuels are essential to the transport of today. Spence Comox* Catalysts are extensively used in petroleum refineries throughout the world, and the carefully controlled conditions under which they are made ensure complete rehability, long life and high activity.

*Comox is the registered trade mark for Spence cobalt and molybdenum oxides on alumina catalyst.

BP MAPS THE FUTURE



There she goes! *H.R.H. The Duchess of Gloucester names her 'British Duchess' and down the slipway and into the Clyde moves the first of BP's 42,000-ton tankers.*

Full steam ahead. *This funnel will be fitted to 'British Duchess' just as soon as they start work on her again; which will be only minutes after she is launched.*

Clydebank's first 42,000-ton tanker

At 1.14 p.m. on Monday, 2nd June, with a roar of hawsers, and a great cheer from the hundreds thronging Clydebank, the first 42,000-ton tanker ever built by a British firm for a British fleet slid gracefully down the slipway. H.R.H. The Duchess of Gloucester had launched—BRITISH DUCHESS.

BUILT by John Brown of Clydebank (they built both the Queen Mary and the Queen Elizabeth) this ship, on order to The BP Tanker Company, is the biggest tanker yet to be built in Britain to sail under the British flag.

Second only to the Queen Mary

The British Duchess is a mighty ship indeed. In fact, as Sir James McNeill, Managing Director of John Brown & Co. said at her launching, "*When she is completed, her displacement tonnage for vessels under the British flag will be second only to the Queen Mary*".

But BP plans far bigger ships than this. Others now building or on order include six 42,000-ton sister ships to the British Duchess, 12 other vessels of 50,000 tons and 7 giants of 65,000 tons.

Oil supplies doubled?

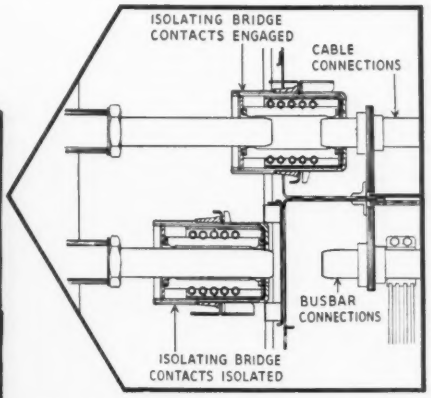
Within the next 10 years Britain may have to double her oil supplies. The British Petroleum Company is making sure that not only is the oil found and brought to the surface and refined, but that there are the ships to carry it. Ships like the British Duchess are even further proof of how confidently BP plans for the future.

THE BRITISH PETROLEUM COMPANY LIMITED

BP

Air-break switchgear for process plant control

incorporating 'ISOLECTOR'



'ENGLISH ELECTRIC' Class 'E' Air-break Switchgear incorporating 'Isolector' represents a great advance in switchgear practice.

With the 'Isolector' mechanism it is no longer necessary to withdraw the truck from the cubicle to isolate the breaker. Isolation facilities, together with the cable earthing switch fitted to each unit, are all readily operated from the fool-proof interlocking gate at the front of the unit.

The 'Isolector' mechanism simplifies busbar selection in duplicate busbar units. These are available in the same cubicle dimensions as single busbar units.

A mimic diagram provides *mechanical* circuit indication and is clearly visible with the door open or closed.

Class 'E' Switchgear is designed for 3·3 kV and 6·6 kV service, with current ratings up to a maximum of 3,000 amps. The gear is housed in a handsome, dust-proof cubicle and has excellent main and multi-core cabling facilities.

'ENGLISH ELECTRIC'

THE ENGLISH ELECTRIC COMPANY LIMITED, MARCONI HOUSE, STRAND, LONDON, W.C.2

Switchgear Department, Liverpool

WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON

SGL.23 F

WORLD'S LARGEST TANKER

This 6,000 gallon refueller, operated by Esso Petroleum Company to refuel the largest international airliners, has a Foden Tractor Unit

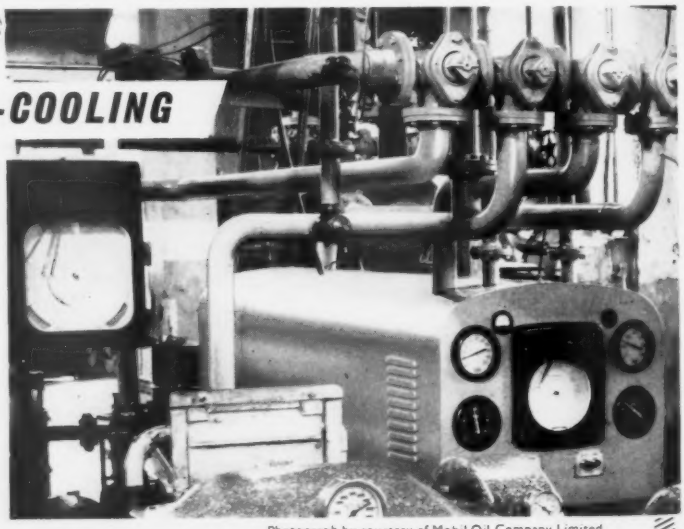
Foden

London Sales Office: 139 Park Lane, London W.1. *Telephone:* GROsvenor 5932

FODENS LIMITED · SANDBACH · CHESHIRE

Telephone: Sandbach 644 (12 lines) *Telegrams: "FODENWAY," SANDBACH*

FOR RAPID GREASE-COOLING



In one installation it took eight hours to cool a kettle of grease. The Votator Grease Cooler now does the job in one hour—practically doubling the production of the kettle. The product passes through the Votator heat-transfer mechanism, and revolving scraper blades constantly expose a clean surface to the grease, resulting in a product of unvarying uniformity.

PILOT PLANT SERVICE. Ask for the advice of our Process Engineers and Laboratory for solving your heating or cooling problems. We can develop new systems or improve existing ones.

Photograph by courtesy of Mobil Oil Company Limited

★ *"Votator" is a trade mark which applies only to the products of the Girdler Co. or their licensees.*

Johnson's

★ Votator GREASE COOLING

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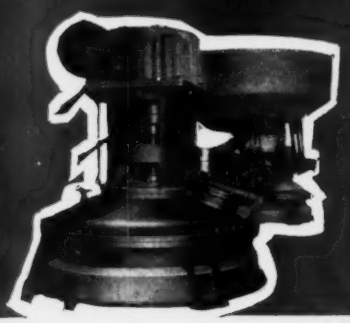
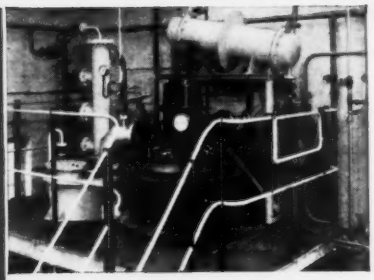
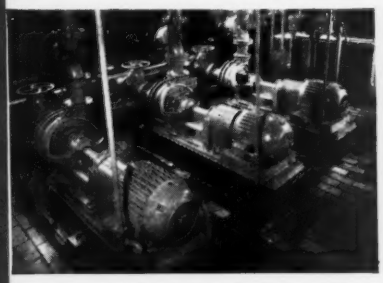
specialise in MODERN CHEMICAL & PROCESS PLANT



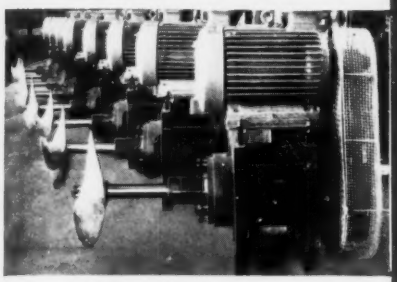
Large kettle installed in a grease plant.



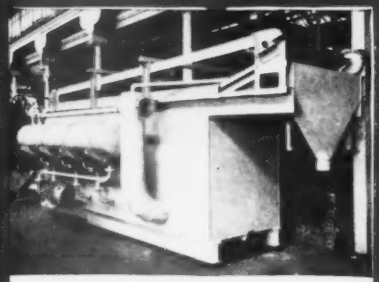
Resin making plant with electric induction heating.



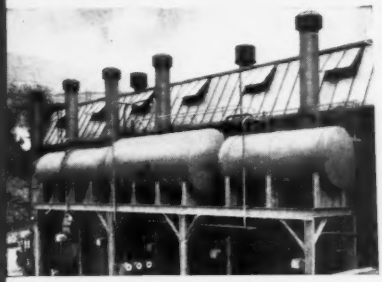
Battery of Mitchell centrifugal acid pumps in a rayon factory.



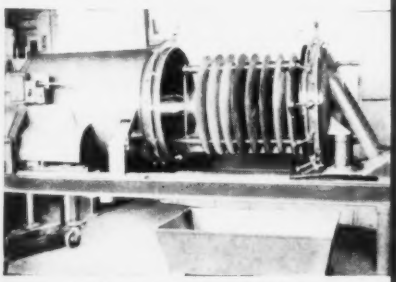
Battery of large side-entry mixers for petroleum blending.



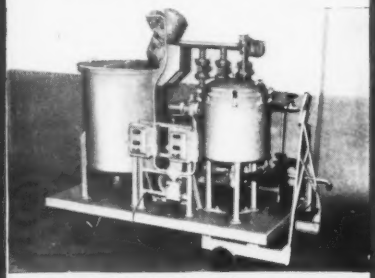
Gibbs air flotation cell plant for the removal or recovery of greasy residues.



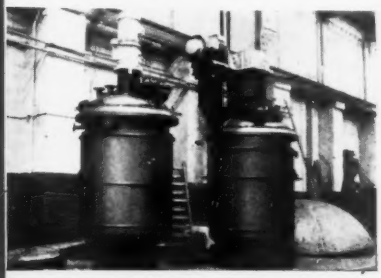
Bulk storage and distribution plant for sulphuric, hydrochloric and nitric acids in the Steel industry.



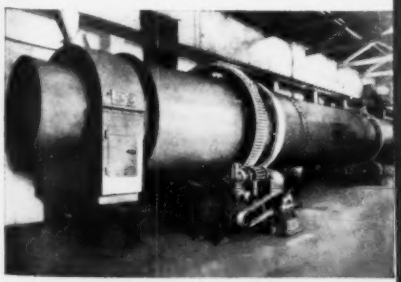
Sparkler MCR retractable tank filter for heavy duty filtration.



Sparkler horizontal plate filter for clarifying resins.



Kettle and autoclave for grease manufacture.



Rotary dryer 8' dia. x 60' long for a fertiliser works in the Middle East.

it will pay you to consult us for

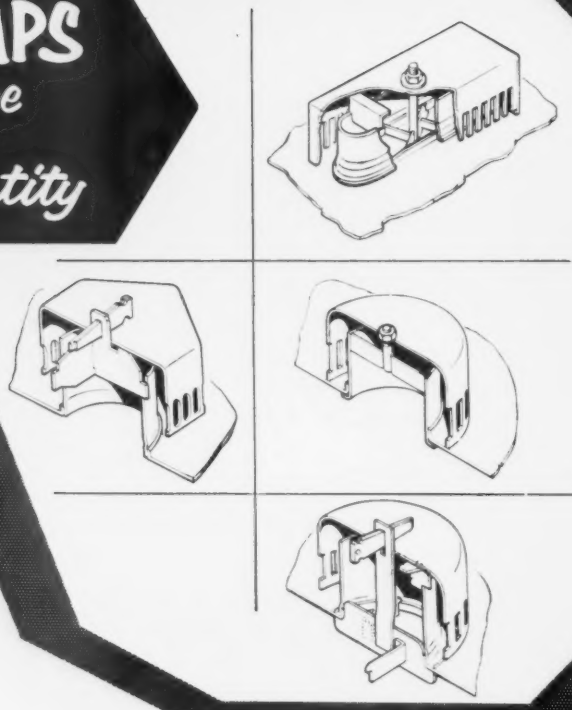
- Complete effluent treatment plants for trade effluents
- Automatic control and automation
- Filtration equipment
- Bulk storage plants for chemical liquids
- Reactors, kettles, autoclaves for resins, grease making re-actions
- Industrial drying and storage equipment
- Pumps for acid liquors.

Write for further information to CHEMICAL ENGINEERING DIVISION

L. A. MITCHELL LIMITED

BUBBLE CAPS

. . . any shape
. . . any size
. . . any quantity



Existing tools for bubble cap assemblies cover a wide variety of sizes, shapes and designs. Round caps from 3″ to 7″ diameter can be supplied in all weldable materials with heights and slot areas to suit almost every process. Hexagonal, pyramid and rectangular assemblies can also be supplied.

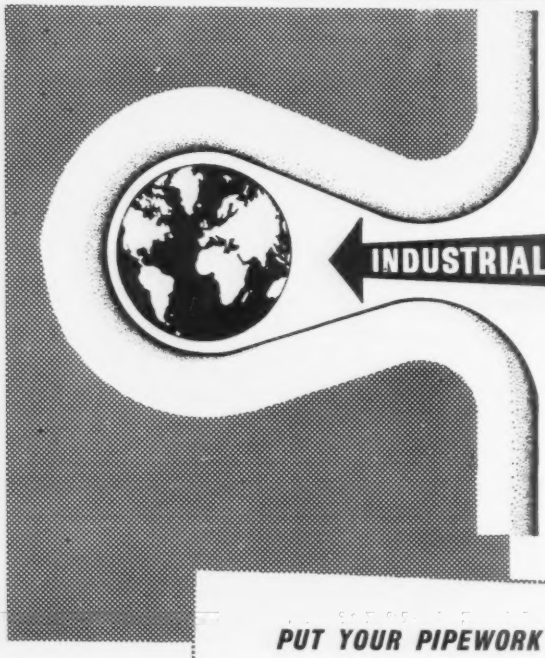
The patented features of Glitsch cap assembly designs enable installation and maintenance to be carried out easily and quickly.

You will save time and money by embodying one of our standard cap assemblies in your tray designs.

Ask for leaflet BT. 156 for further details

Metal Propellers Limited
STAINLESS STEEL SPECIALISTS

74 PURLEY WAY, CROYDON, SURREY
Tel: THOrnton Heath 3611-5



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As the development of world resources accelerates — extra shipping, refinery investment, industrial expansion, nuclear applications — the demand for top quality pipework increases.

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Top quality pipework? That's where Lawrie's step in. For many years we have been producing fabricated pipework to B.S. and A.P.I. standards, our welding is approved by Lloyd's and other inspecting authorities, and we are on the approved list of pipework contractors to the U.K. Atomic Energy Authority.

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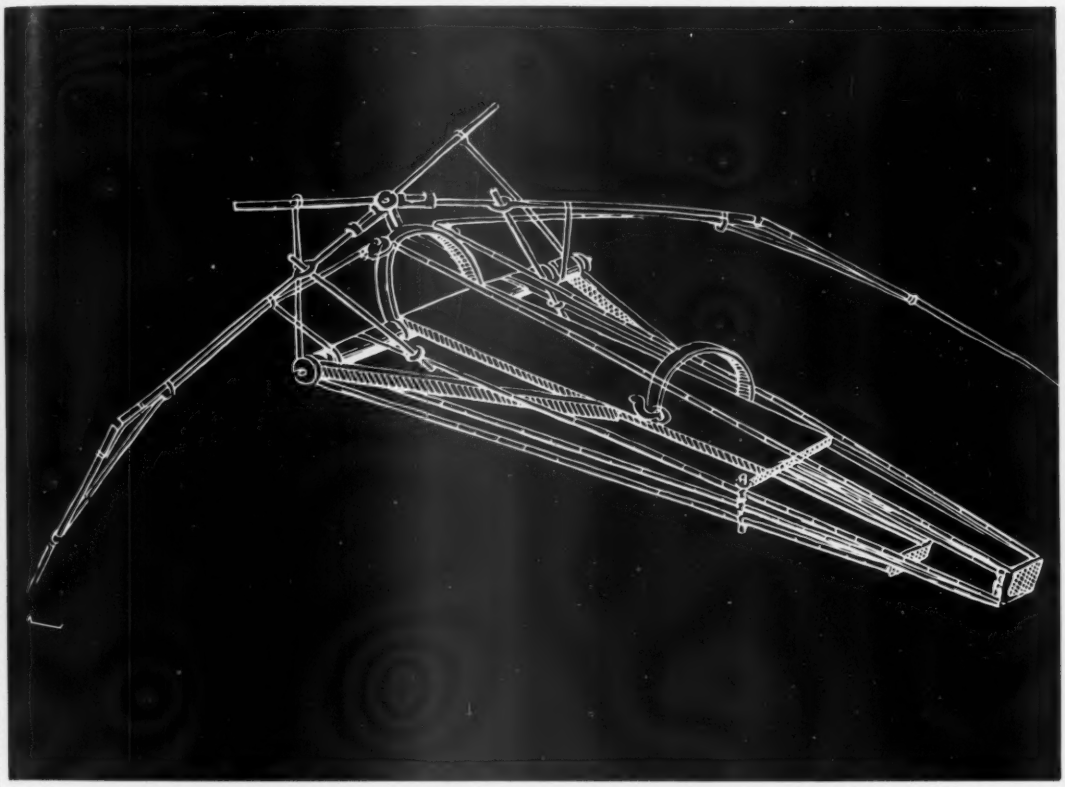
London Office: 34 Victoria Street, London, S.W.I. *Telephones: ABBey 4937 and 1847*



From a Science Museum photograph

Wright and . . . not necessarily wrong

MEN HAD DREAMED of flight for thousands of years before 1903, when the Wright brothers changed dream to reality. One of the most practical dreamers of older times was Leonardo da Vinci, whose drawing for the mechanism of a flying machine is illustrated here. Before we scoff at this attempt to reproduce the mechanisms of a bird's wing, we should remember that the Russians are said to be experimenting seriously with flapping wing aircraft today.

Indeed, between Leonardo's dreams and the practical achievement of the Wright brothers, differences in design may well have been less important than the difference in available power. It was the light-weight power of the internal combustion engine that lifted man into the air; and it was the oil industry that made available the fuels and lubricants for the internal combustion engine. The era of flight had to wait for the era of oil.

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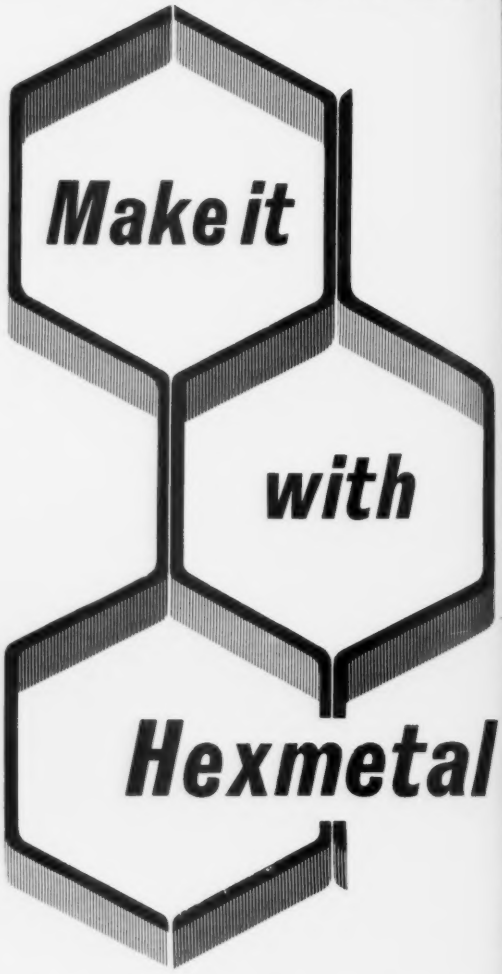

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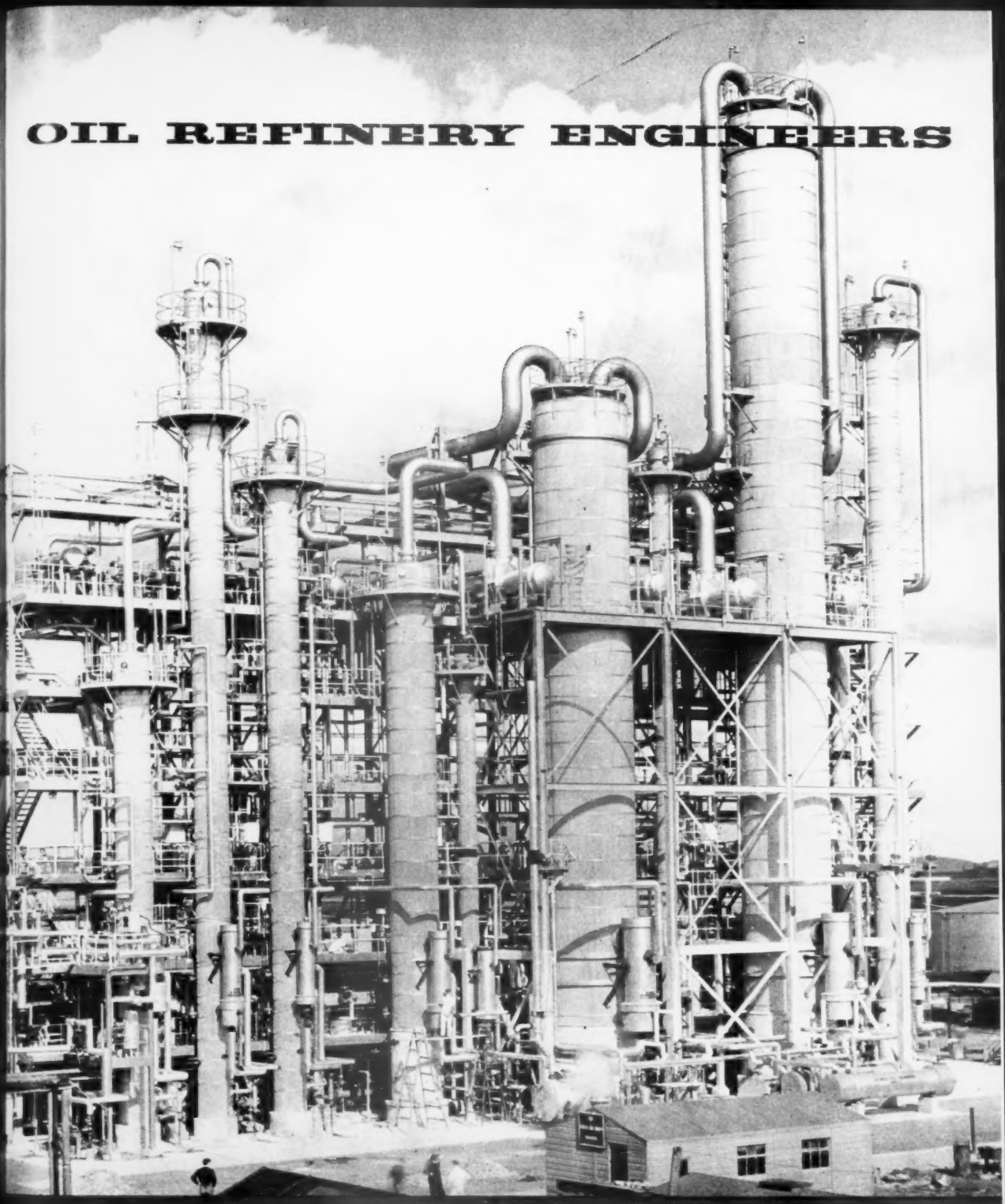

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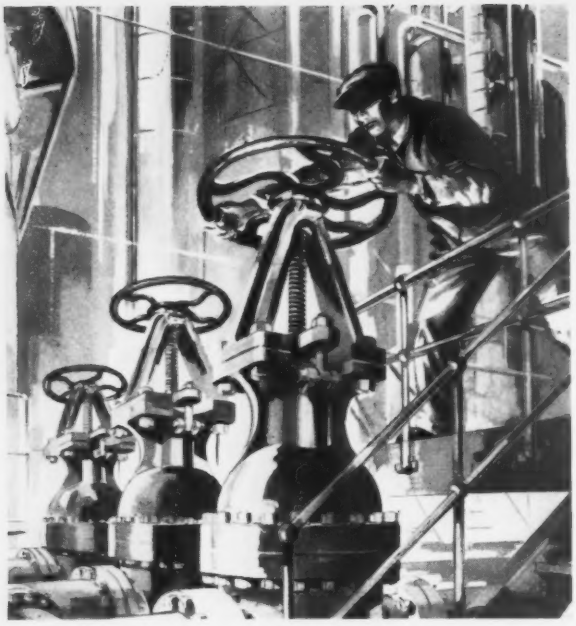

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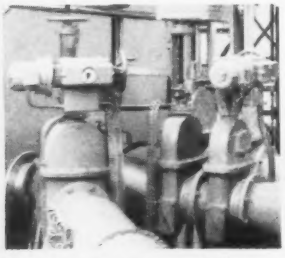
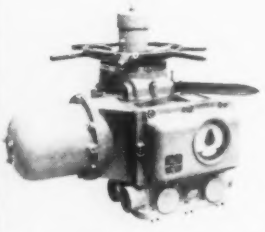


This photograph of air supply lines to reactor at A.E.R.E., Harwell shows 12" Cort valves fitted with Rotork 100 A II actuators.



A Rotork 50AS actuator, Buxton Certified FLP Groups II and III, as used by Shell, B.P., Esso, Kuwait and Standard, for operating gate and conduit valves.

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Piling and tank foundation construction in progress for B.P. Refinery (Kent) Ltd on the Isle of Grain.
(Photography by courtesy of the British Petroleum Company Ltd)

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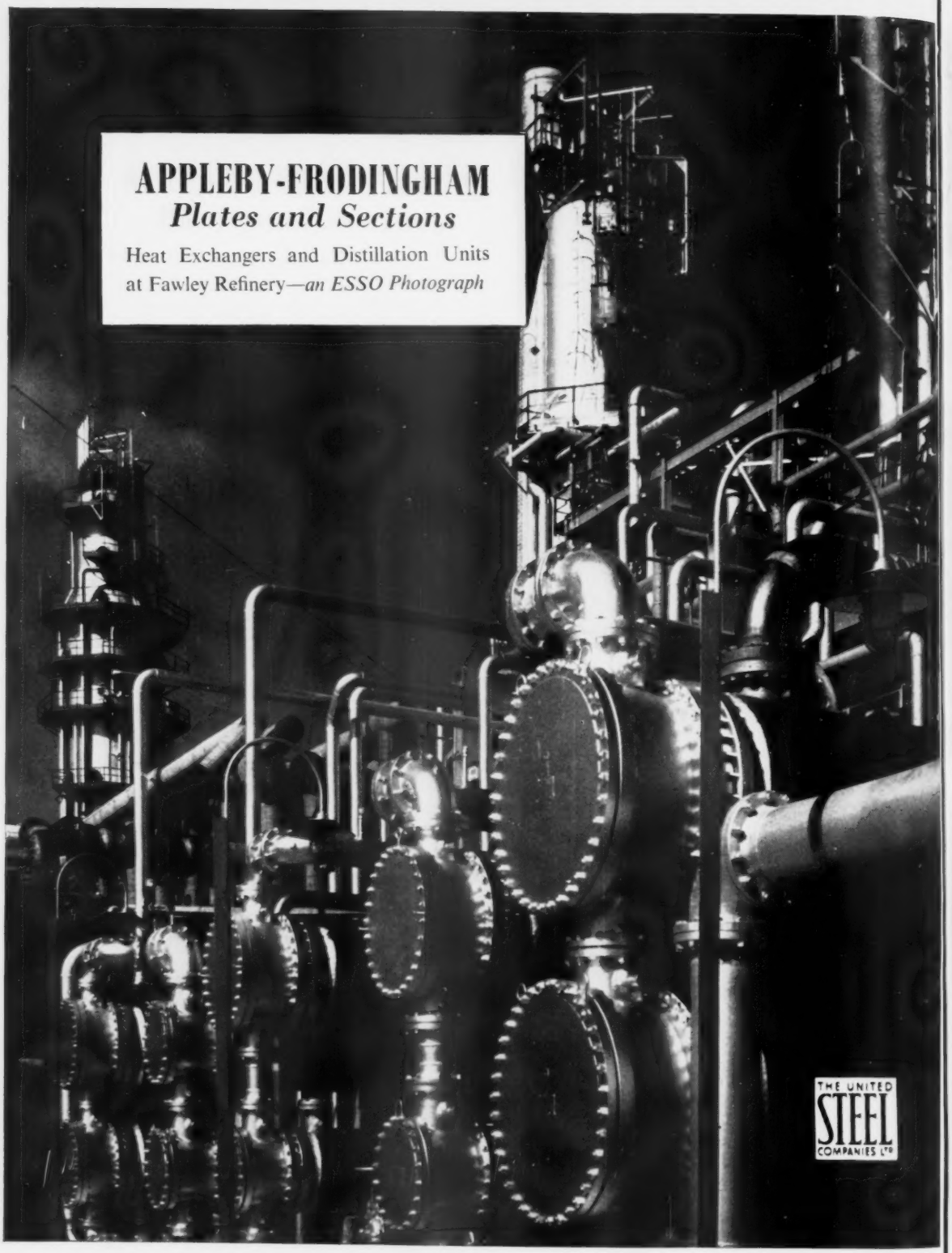

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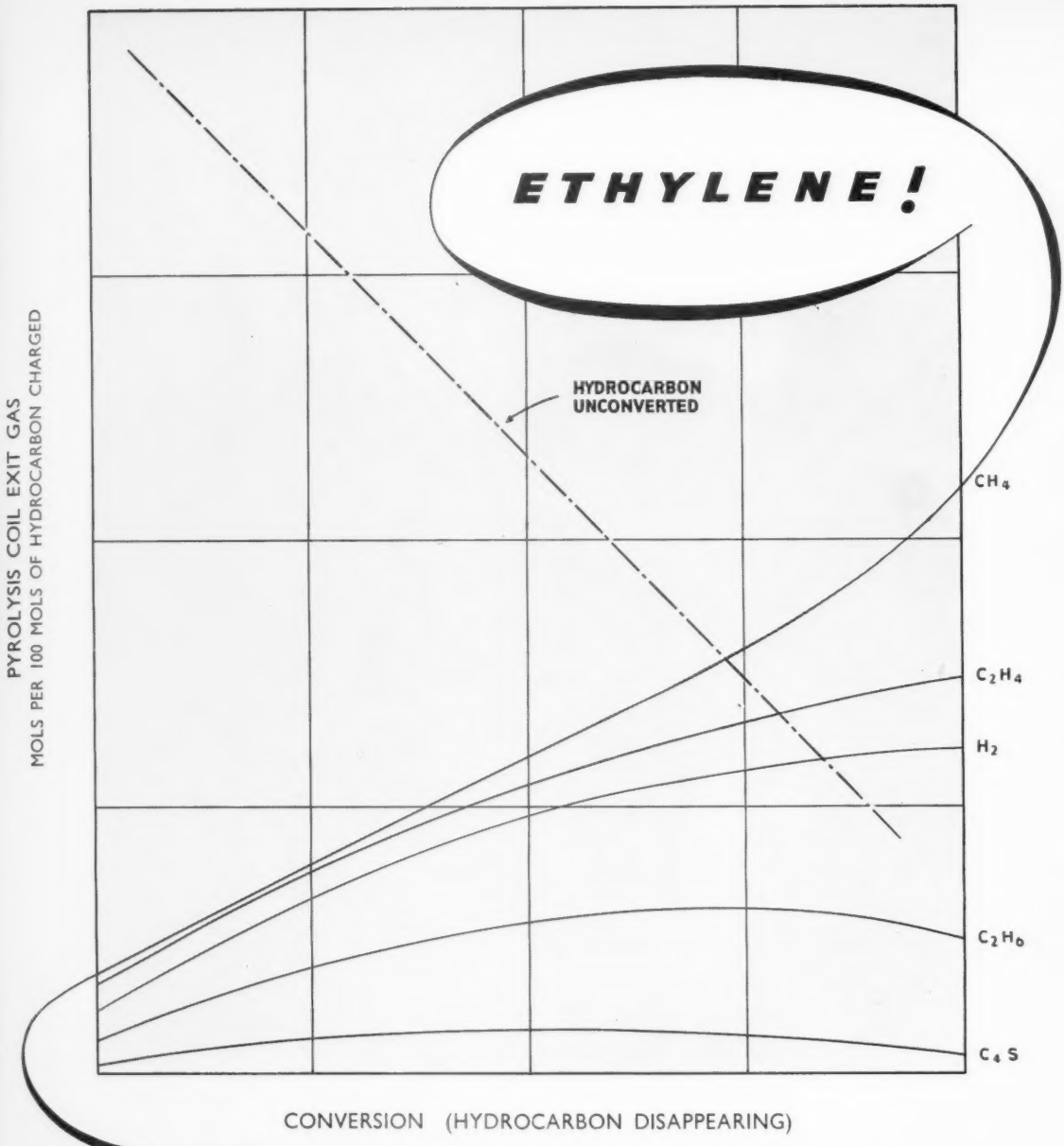

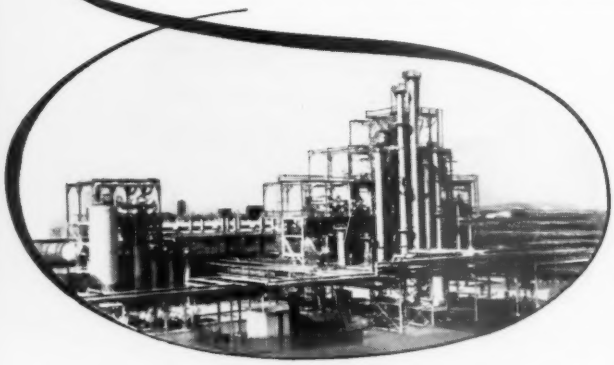

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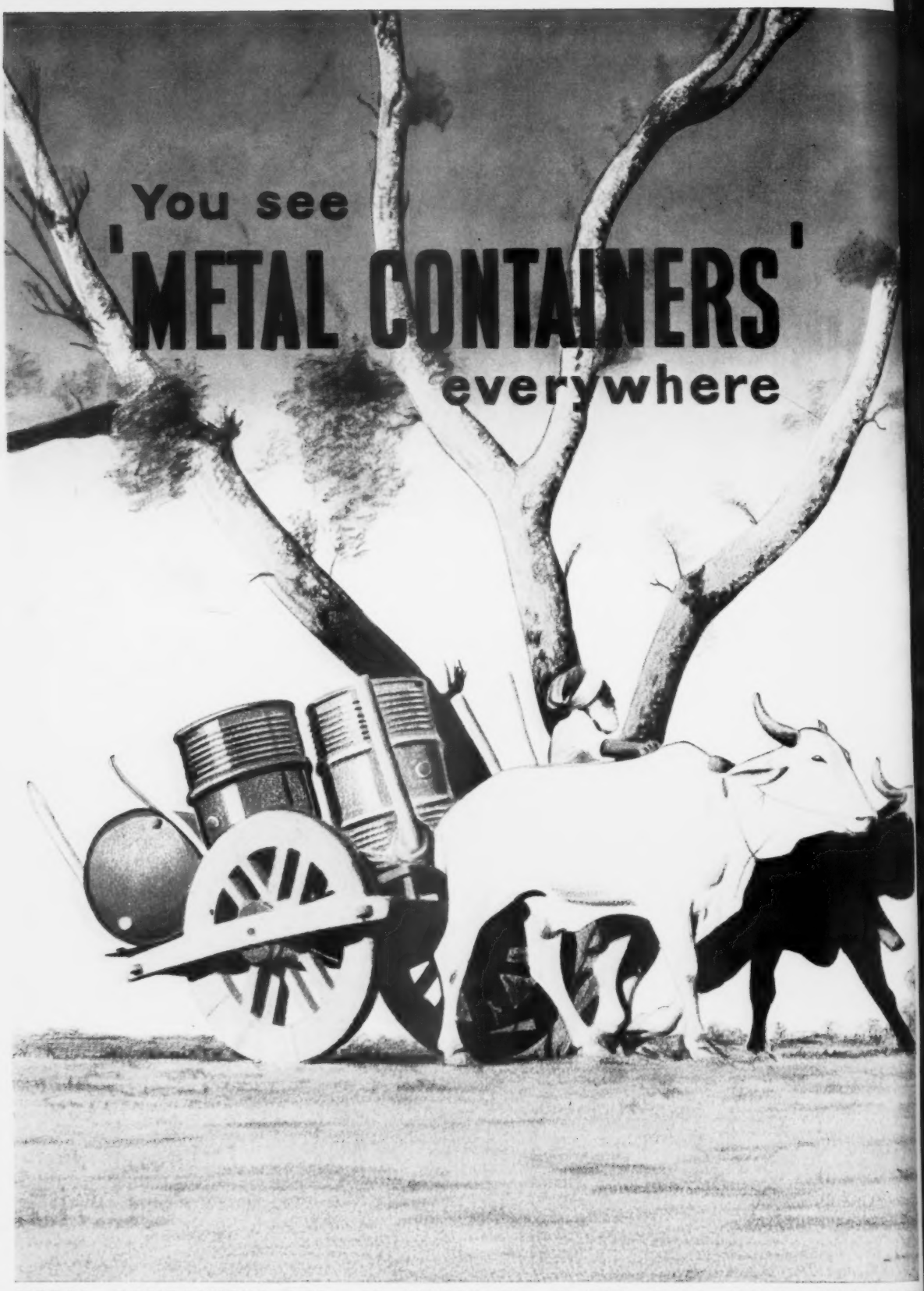

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